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PATENT DUCTUS ARTERIOSUS: A POST-OPERATIVE REVIEW.

By DOUGLAS STUCKEY.

From the Royal Alexandra Hospital for Children, Sydney.

PRIOR to April, 1954, 51 children underwent operation for ligation of a patent *ductus arteriosus* at the Royal Alexandra Hospital for Children. For some years it has been the policy of the Congenital Heart Disease Clinic to recommend operation whenever the diagnosis of patent *ductus arteriosus* is firmly established, regardless of the presence or absence of symptoms. This review has been undertaken in an attempt to determine whether this policy is justified. The ages of the children ranged from eighteen months to twelve years, the majority being aged between two and seven years.

Ætiological Factors.

Forty of the patients were females and 11 males, a female preponderance of 3·8:1. The mothers of eight patients had suffered from rubella during the early months of pregnancy. In three instances there were two affected sisters in one family. Outside this series one instance is known to the writer in which a patent *ductus arteriosus* occurred in three members of one family.

Symptoms.

Before operation 10 patients were short of breath on exertion, eight others became tired more easily than the average child, and the remainder had no apparent symptoms. After operation, with the exception of one child in whom recanalization occurred within a few days after operation, all the patients were active, energetic and entirely free from symptoms. An improvement in energy and general level of activity after operation was often noticed by the parents even when there had been no obvious symptoms before. Retrospectively it was clear both to the parents and to ourselves that many of these children with no apparent symptoms before operation were in fact limited in their activities by their lesion.

Growth and Nutrition.

Before operation many of the children were thin and underweight. Of 36 whose weight was recorded before operation, 16 were well under average for their age and sex. The height of 29 was recorded, and nine were well under average figures. More impressive were the changes after operation. Accurate figures for weight before and after operation were available for 13 patients, and in this group the average gain in weight in the first twelve months after operation was 11 pounds, the best weight gain being 10 pounds in seven months. The height of 10 patients was recorded accurately before and after operation, and the average increase in height in this group was almost four inches in the first twelve months after operation, the

greatest increases being nine inches in eighteen months and five inches in seven months. These figures are well above average normal for annual increase in weight and height in the age group concerned, and confirm the clinical impression that after ligation of the ductus there are impressive increases in both weight and height in some children, particularly in those who have been below average before operation. Adams and Forsyth (1951), in a post-operative review of 53 cases, reached similar conclusions.

Blood Pressure.

In 49 cases blood pressure readings taken before operation were available. The systolic pressure was greater than 120 millimetres of mercury in 12 patients, the highest pressure recorded being 150 millimetres of mercury. A diastolic pressure of zero was recorded in three cases. The average pulse pressure for the whole group was 63 millimetres of mercury; in eight patients the pulse pressure was less than 50 millimetres of mercury, and in only three of these was it less than 40 millimetres of mercury. The effect of exercise on the pulse pressure was tested on a number of patients, but no consistent changes were found.

Post-operative blood pressure readings were available for 44 patients. The systolic pressure was more than 120 millimetres of mercury in only three patients, and the highest reading was 130 millimetres of mercury. The average pulse pressure for the group was now 33 millimetres of mercury; in only five patients was the pulse pressure greater than 40 millimetres of mercury, and in none was it greater than 50 millimetres of mercury.

It follows that a pulse pressure of more than 50 millimetres of mercury is valuable supporting evidence for the presence of a patent *ductus arteriosus*.

Murmurs.

Before operation, a continuous murmur of classical machinery type was heard in 46 patients, a systolic and a diastolic murmur in four, and a systolic murmur only in one patient. In 41 patients a systolic thrill was felt. The murmur was maximal at the pulmonary area in 33 patients, and in 16 the site of maximal intensity was placed more laterally in the first or second intercostal space in the mid-clavicular line.

After operation, four patients had either a continuous murmur or both systolic and diastolic murmurs. These cases, in which the possibility of recurrence arises, will be discussed in more detail below. A soft systolic murmur at the pulmonary area was heard in 14 patients and a moderate systolic murmur in three. In the remaining 30 patients no murmur could be heard after operation.

Radiological Appearances.

Radiological examination was carried out on 48 patients before operation. The heart appeared to be enlarged in 27, in four of these considerably. In 39 the main pulmonary artery was increased in size, and in 35 there was increased vascularity of the lung fields. In 24 of 27 patients, post-operative radiological examination revealed that the size of the heart had diminished. The vascular markings in the lungs were less obvious in many patients after operation, but the prominent main trunk of the pulmonary artery usually remained unchanged.

The Electrocardiogram.

In 31 of 48 patients, the electrocardiogram before operation was within normal limits. In the remainder left ventricular preponderance was seen; this was slight in 13, moderate in three and pronounced in one patient. After operation the electrocardiograms showing moderate or pronounced left ventricular preponderance were more nearly normal, and in the remainder there was no change.

Operative Details.

There were no operative or post-operative deaths. An anterior incision between the second and third ribs was used in the first few cases, but this gave inadequate exposure. Later a long postero-lateral incision was used, at first in the fourth intercostal space, later through the bed of the fourth or fifth rib with resection of the rib. After operation there was rapid regeneration of the rib that had been removed, and within a few months the thoracic cage appeared normal on radiological examination.

The ductus was ligated in all cases, with silk or stout linen thread. In some of the early cases "Cellophane" was wrapped round the ductus as well. Double or triple ligation was used in about equal numbers of patients, the third centrally placed ligature being used after the two ends had been ligated if the ductus was long enough to allow it.

Cardiac arrest occurred in three patients during operation; all recovered after cardiac massage. In two this occurred before the ductus was ligated, and in one after the chest had been closed. Paroxysmal tachycardia occurred once, and irregularities of the pulse were noted during operation in two other patients.

The post-operative course was smooth and uneventful in the great majority of cases. In one there was persistent collapse of the lower lobe of the left lung, and in one a persistent left pleural effusion. Both these conditions responded to treatment. In two other cases the post-operative course was stormy, and there was some doubt as to whether this was due to cardiac or pulmonary factors. In both these patients persistent murmurs have raised the possibility of recurrence, and they are discussed in more detail in the next section.

Recurrence.

In one patient a typical continuous murmur was heard on the third day after operation and on later occasions, and a wide pulse pressure persisted. There seemed little doubt that recanalization had occurred. In two other cases a soft continuous murmur could be heard, and in a third soft systolic and diastolic murmurs were heard at the pulmonary area. These three patients were much improved after operation, and the pulse pressure had diminished to figures well within normal limits. It is probable that in these patients ligation had considerably reduced the ductus in size, but had not completely obliterated its lumen, so that a small shunt of blood was still taking place from the aorta to the pulmonary artery.

Discussion.

Surgical obliteration of the patent *ductus arteriosus* is one of the most satisfactory of all operations, in that the end result is entirely normal anatomy. In our experience the operation on children has been a safe and satisfactory procedure.

The three ætiological factors mentioned—namely, preponderance in the female, familial incidence and maternal rubella in the early months of pregnancy—are common in patent *ductus arteriosus* and uncommon in other congenital heart lesions. These factors have been noted by other observers (Brown, 1949; Jackson, 1950; Wood, 1950).

The beneficial effects of ligation of the patent *ductus arteriosus* are confirmed with regard to exercise tolerance and general level of activity. Recorded increases in weight and height after operation are well above average figures. Our surgeons consider that from the technical point of view the operation is more easily performed on young children, so that it seems reasonable, whenever the diagnosis is firmly established, to recommend operation from the age of eighteen months or two years upwards, even in the absence of any apparent symptoms. The child may thus be given the benefit of a normal cardio-vascular system during the important period of active growth. As has been pointed out recently by Powell (1954), symptoms in the first few months of life may necessitate earlier operation.

The characteristic continuous murmur remains the mainstay of diagnosis in patent *ductus arteriosus*, and a wide pulse pressure is valuable supporting evidence in a majority of cases. Preponderance of left ventricular activity, both on clinical examination and in the electrocardiogram, is

characteristic, as are radiological appearances of cardiac enlargement, prominence of the main trunk of the pulmonary artery and increased vascular markings in the lung fields. However, both the electrocardiogram and the radiological appearances may be within normal limits in some cases.

After operation, a soft systolic murmur could be heard at the pulmonary area in about one-third of the cases, and it has persisted for several years in some. This seems to be of no significance, and may be associated with the persistence of a large main pulmonary artery. A continuous murmur, even if soft, probably means that the lumen of the ductus has not been completely obliterated.

Summary.

Ligation of a patent *ductus arteriosus* was carried out in 51 children. There were no operative or post-operative deaths.

Preponderance in the female, familial incidence, and maternal rubella during pregnancy were prominent ætiological factors.

Improved exercise tolerance and general level of activity were found after operation in most patients, even when there had been no apparent symptoms before. There were impressive increases in both weight and height after operation in many of the children, especially when these had been below average previously.

The typical continuous murmur and a pulse pressure of more than 50 millimetres of mercury were the most important diagnostic signs.

A soft systolic murmur in the pulmonary area was heard after operation in about one-third of the cases, and was thought to be of no special significance. In one patient recanalization occurred during the post-operative period. In three others, although their condition was much improved after operation, the physical signs suggested that a small shunt was still present.

Acknowledgements.

The writer is indebted to the other members of the Congenital Heart Disease Clinic, in particular to Mr. T. Y. Nelson and Mr. E. S. Stuckey who operated on these patients.

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THE DETERMINATION OF SODIUM AND POTASSIUM IN THE "BECKMAN MODEL DU" FLAME SPECTROPHOTOMETER.

By O. E. NEWFIELD AND F. A. TILSON,

Repatriation General Hospital, Heidelberg West, Victoria.

IT is obvious that a method for the speedy determination of sodium and potassium in the blood serum is of great help to the physician, particularly in resuscitation work. It is for this reason that a large number of flame photometers have been installed in the larger pathology departments all over the world. However, it soon became evident that the flame photometer was far from being a foolproof instrument which could at all times be relied upon to give correct results on complex fluids containing a large number of highly complex organic compounds. It is even more obvious that wrong or highly inaccurate results can seriously endanger the life of the patient in resuscitation work. There can be no doubt that such a danger does exist when serum diluted with water is compared with aqueous standards in a "Beckman Model DU" spectrophotometer fitted with a palladium-tipped metal injector.

In 1950 check work was carried out to compare a chemical method with the findings from a flame spectrophotometer. The chemical method used was an extremely carefully checked modification of the Abul-Fadl method (Abul-Fadl, 1949; Neufeld, 1951). The flame spectrophotometer was a "Beckman Model DU" quartz spectrophotometer, which was adapted for use as a flame photometer by the addition of an all-glass injecting system (Wynn, Simon, Morris, McDonald and Denton, 1950). There was perfect agreement between the results obtained by the two methods, and the average levels agreed very well with those given by other workers (Elliot and Holley, 1951), who also used a glass injector system. Furthermore, the results obtained were in agreement with the clinical findings.

It was therefore quite unexpected that higher levels of serum potassium were obtained by the use of a "Beckman Model DU" spectrophotometer and flame attachment, which was supplied with an all-metal palladium-tipped injection system. Several such instruments were used for comparative tests, oxygen-hydrogen as well as oxygen-acetylene gas mixtures being used.

The results obtained from the same specimens of serum by comparison with the same set of standards in the various instruments were the same, whether hydrogen or acetylene was used. Alteration of dilutions, slit widths and sensitivities did not appear to make any difference. However, the results did not agree with results obtained by the chemical method, all being too high; they varied neither by a constant additional amount nor by a definite percentage increase. Some typical results are set out in Table I. Further, it was frequently noted that sera from

TABLE I.

Serum.	Chemical Method.[1]	Flame Photometer.[1]	Percentage Difference.
A	10·0	11·0	10·0
B	11·5	12·5	8·7
C	13·0	18·5	34·6
D	14·5	16·0	10·3
E	15·5	16·5	6·4
F	18·5	25·5	37·8
G	20·0	21·5	7·5
H	30·0	30·0	0

[1] All results in milligrammes per 100 millilitres.

patients with electrocardiographic changes strongly suggestive of potassium deficiency, gave normal values in the flame photometer, but low values by the chemical method.

Not even a speculative explanation can be offered as to why the results of the chemical method agreed so well with those obtained by the old model flame photometer which was fitted with an all-glass injection system, but failed to agree with those of the photometer with the metal injector and burner.

The makers of the instrument were communicated with, and a copy of an article was obtained which recorded the fact that many other laboratories had encountered the same difficulties, and at the same time suggested an alternative procedure; this consisted of precipitating the protein from the serum by the use of trichloracetic acid and isopropyl alcohol. The results obtained by this method in this laboratory were no better than those obtained by direct serum dilution; in fact, in some cases cloudy solutions were obtained when the precipitated protein was centrifuged. Those solutions which were not crystal clear gave even higher results than direct dilutions for serum potassium. Filtering did not lead to any improvement in those cases.

An attempt was then made to eliminate the protein by evaporating the serum to dryness in a crucible over steam and taking up the residue with hot water. After the precipitate had been spun down, the liquid was used for flame photometry. The results obtained were much more hopeful, but occasionally an isolated high result was still obtained. This method was finally abandoned when it was found that by diluting the serum and likewise the standards, excellent results could be obtained without any need for a precipitation step. The use of lithium chloride as a diluent was adapted from a procedure suggested by Herrmann (1953), who used it as an ultra-micro method (using 0·005 millilitre of serum) in a specially built flame photometer, and by others who added lithium to their electrolyte solutions to study effects of viscosity.

Proposed Method for Serum Potassium Determination.

The reagent used is prepared as follows.

For lithium solution A, 26·617 grammes of lithium carbonate are dissolved in water with the aid of sufficient hydrochloric acid and diluted to 1000 millilitres.

For lithium solution B, four millilitres of solution A are diluted to 1000 millilitres with water. All water used must be carefully distilled.

The method is as follows.

A hydrogen-oxygen burner is used. The serum (usually 0·2 millilitre) is diluted with the lithium solution B to 1 in 50. Standards containing potassium chloride in amounts comparable with serum (for example, 10, 15, 20 milligrammes per 100 millilitres) are diluted likewise with the same lithium solution. The diluted standard should be made up at least every second day. The serum dilutions are compared with the standards at wave-length 767mμ and a slit width of 0·2 millimetre, the 20 milligrammes per 100 millilitres standard being set at 50% transmission. There is almost perfect linear relationship between percentage transmittance and concentration, the 10 milligrammes per 100 millilitres standard usually reading 26.

When the flame intensities of the serum and standard are read at the lithium wave-length (671mμ), it will be found that a slight enhancement occurs, the serum dilution reading usually being between 51 and 52. A correction (0·5 to 1·0 milligramme per 100 millilitres) is allowed for this, the result always being brought to within 0·5 milligramme per 100 millilitres of that obtained by the chemical method, which is the limit of error for that method.

Determination of Serum Sodium Content.

The determination of serum sodium content by the same model flame photometer is not free from pitfalls. Whereas good results were obtained from the older glass injector models for a serum concentration of 1:400, it was found that such dilutions gave low values for serum sodium with the new instrument.

The solution as prepared for the flame photometric determination of potassium may be used, or it may be further diluted to a maximum of 1:1 with water (slit width 0·03 millimetre). To obtain accurate results, a standard closely approaching the concentration in the serum should be used.

Summary.

It was found that direct dilutions from serum gave high results for potassium in the "Beckman Model DU" flame photometer with a palladium-tipped metal injector system. A method to obtain correct results by the dilution of the serum with a lithium-containing solution is described. A method for serum sodium determination is described.

Acknowledgements.

We wish to thank Dr. R. B. Maynard for his interest and assistance in this work, and the Chairman of the Repatriation Commission for permission to publish this paper.

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OBSTETRICS IN A COUNTRY GENERAL PRACTICE.

By PAUL HOPKINS,
Mackay, Queensland.

THIS report presents the results of 1500 obstetric cases in a typical country general practice. This practice is conducted in Mackay and the surrounding district, which is a tropical area. The patients were all private patients, and their ante-natal supervision and confinement were carried out by this practice in the two private hospitals in Mackay.

One other private hospital existed in Mackay; it was closed in 1948. There were 72 patients confined in this hospital, but they have not been included in this series, as no hospital records were available for checking. There were no untoward results in these cases and no maternal deaths, and the practice records show no variation of results. The only case of uterine inversion occurred in this hospital, and the uterus was replaced surgically, the mother recovering to have a normal confinement later.

A system of week-end relief for practitioners exists in Mackay, so some of these patients have been confined by others during a week-end; these patients have been included in the results. Any patient who has been confined for another practitioner during a week-end or holiday has been excluded.

One case must, however, be recorded, because it was the only maternal death encountered during this period. This patient, who had been consulting another practitioner, was examined for the first time immediately prior to confinement, when he was away. Gross toxæmia was present, and the patient developed post-partum eclampsia and died. This case is reported as unbooked, and is not included in the following report of booked patients.

PERIOD INVOLVED.

The booked patients have been divided into three groups, each of 500, in an endeavour to show any improvement or deterioration in results. I have been in practice since 1928, so I was not inexperienced when this series commenced.

The first group contains patients confined between March, 1946, and February, 1949, the second group those confined up to October, 1951, and the third, confinements up to July, 1954.

NARCOSIS.

"Nembutal" was used freely in the earlier cases, and some very good results were obtained, from the mothers' point of view; but there were some difficult resuscitations of babies. However, none died because of the "Nembutal". Pethidine and ether ("open" method) are now used for the delivery.

The Grantly Dick Read method was tried for a time, but the necessary time and staff are not available, so good results cannot be expected. However, the reading of his book by *primiparæ* does much to remove the fear of labour.

BIRTHS INCLUDING TWINS.

Table I shows the births in the series.

TABLE I.

Babies.	Group. 1 to 500.	Group. 501 to 1000.	Group. 1001 to 1500.	Total.
Male	266	257	240	763
Female	239	247	263	749
Total	505	504	503	1512

There were 12 twin births, 22 of these babies surviving and two being stillborn. One of these stillbirths was due to toxæmia in the mother causing premature labour (ten weeks early). The living twin was congenitally deaf. The other stillbirth was due to gross abnormality in the baby, the surviving child being normal. Both of these stillbirths occurred in the first group.

MATERNAL DEATHS.

There were no maternal deaths in the booked cases, the one maternal death in an unbooked case having been mentioned previously.

PARITY.

The parity of the mothers is shown in Table II.

TABLE II.

Parity.	Group. 1 to 500.	Group. 501 to 1000.	Group. 1001 to 1500.	Total.
Primiparæ ..	212	190	168	570
Multiparæ ..	288	310	332	930
Total	500	500	500	1500

The youngest *primipara* was aged fourteen years, the oldest forty-two years.

TYPES OF DELIVERY.

The types of delivery were as follows (Table III).

TABLE III.

Group.	Normal.	Breech.	Forceps.	Cæsarean Section.	Total.
1 to 500 ..	359	19	120	7 (1·4%)	505
501 to 1000 ..	318	10	162	14 (2·8%)	504
1001 to 1500 ..	307	11	166	19 (3·8%)	503
Total ..	984	40	448	40 (2·6%)	1512

Although the figures are small, the reduction in the number of breech deliveries in the last two groups is obvious. It is considered that this is due to more care being taken with the diagnosis and the full use of X rays. From the seventh month onwards version is attempted in the consulting room as soon as the diagnosis is established. If the attempt is not successful, and the X-ray film suggests that version is possible, it is attempted under general anæsthesia one week before the due date. If then successful, it is followed immediately by induction of labour, medical or surgical according to the indications.

The forceps delivery rate is high. This is due to the practice of frequently applying forceps when the head is crowned, and lifting it over the perineum with episiotomy. I wait till the head is visible and well down, and very rarely use axis traction these days. This practice may be open to criticism, but I have no reason to regret it.

Cæsarean Section.

The percentage of Cæsarean sections (40 cases, 2·6%) has risen from 1·4 in the first group to 3·8 in the third group, the overall figure being 2·6.

There were 40 Cæsarean operations, three classical and 37 lower segment. Once the change from the classical to the lower segment operation was made all were of the lower segment type.

I use "open ether" as a routine for both induction and maintenance of anæsthesia and never use ethyl chloride. Oxygen is given once anæsthesia is induced. The aim is to deliver the child in twenty minutes from the commencement of induction of anæsthesia, and there has been no great difficulty in keeping within this time, fifteen or sixteen minutes being about the average time taken.

The rise in the number of Cæsarean operations for disproportion in the last two groups is due to more accurate diagnosis, and also to the desire to avoid the old, difficult and dangerous "high forceps" operation. Over the years I have been greatly impressed by the morbidity of the mothers after this "high forceps" operation. "I have never been the same since my first baby" is an expression still too often heard. Of course, Cæsarean operation is by no means the sole solution to this problem, early induction of labour being my normal practice. Six operations followed trial of labour.

Two patients who underwent lower segment Cæsarean operation for *placenta prævia* have had normal deliveries since operation.

In the four cases of abnormal uterine action, the shortest duration of labour was four days and the longest five days before operation.

There were nine cases of repeated Cæsarean section, of which eight were for disproportion and one because of previous classical operation and myomectomy.

Indications for Cæsarean Section.

The indications for Cæsarean section are as shown in Table IV.

TABLE IV.

Indication.	Group. 1 to 500.	Group. 501 to 1000.	Group. 1001 to 1500.	Total.
Disproportion	4	6	8	18
Abnormal uterine action ..	—	—	4	4
Prolapse of cord in a *primipara* with two fingers' dilatation of os	—	1	—	1
Breech presentation — extended legs, and possible disproportion	1	2	—	3
Brow presentation	1	1	—	2
Placenta prævia	—	4	2	6
Maternal toxæmia	1	0	2	3
Previous classical operation and myomectomy ..	—	—	1	1
Previous recto-vaginal fistula	—	—	1	1
Two previous stillbirths ..	—	—	1	1
Total	7	14	19	40

INFECTION.

Infection has not been a problem. The sulphonamide group of drugs and penicillin have been available throughout the series with a rapidly growing choice of antibiotics.

Penicillin and suphadiazine are used freely, but not as a routine. Any patient who has had more than normal handling, such as a large episiotomy or tear, is given penicillin for three days. Other antibiotics are rarely used, and then only with definite indications.

TOXÆMIA.

The total number of patients with toxæmia was 101 or 6·7% of all cases. This includes all patients admitted to hospital for treatment. Patients requiring only dietary adjustments and more rest, and no hospital treatment, have not been included.

The diets and principles laid down by R. B. C. Stevenson (1952) have been used freely, and they have given very good results.

As a general practice I work on the principle that if more than one of the following features are present, the patient should be admitted to hospital: (i) a systolic blood pressure over 160 millimetres of mercury and a diastolic pressure over 90 millimetres; (ii) excessive gain in weight; (iii) albuminuria. However, I do not hesitate to admit to hospital any patient who from the appearances I consider requires treatment.

TOXÆMIA.

The manifestations of toxæmia are set out in Table V.

TABLE V.

Manifestation of Toxæmia.	Group.			Total.
	1 to 500.	501 to 1000.	1001 to 1500.	
Hyperemesis	1	1	—	2
Hypertension	—	—	1	1
Pre-eclampsia	26	34	33	93
Eclampsia	—	3	—	3
Chronic nephritis	1	1	—	2
Total	28	39	34	101

Analysis of Toxæmias.

The subsequent history of 13 patients cannot be traced. Of the remaining 88 patients, 39 have since had confinements, only 10 again developing toxæmia. Of all patients who had toxæmia, five have remained hypertensive.

There were two cases of chronic nephritis; in one case the child died *in utero* during treatment at six months, and the mother died one year later from uræmia; the other patient has had three living children and is living a normal life, but is hypertensive, with a little albumin in the urine.

Of the seven stillbirths in toxæmia, six occurred *in utero* during treatment, between six and seven months. One of these fœtuses was a twin, and the other twin survived. Four patients were *primiparæ* and the other three pregnant for the second time. Four of those seven mothers have had a living child since, and one other is pregnant.

Eclampsia.

Eclampsia occurred in three cases (0·2%) of the total and in 3% of the cases of toxæmia. One patient had ante-partum eclampsia at seven months with a stillbirth, one had intra-partum eclampsia at term with a stillbirth, and finally one had post-partum eclampsia with a living child.

The youngest toxæmia patient was a *primipara*, aged eighteen years, the oldest a *multipara*, aged forty-five years.

Induction of Labour.

Twenty-eight patients had a medical induction of labour for toxæmia; six of these inductions failed, and labour was induced surgically.

Two patients had primary surgical induction of labour, and in eight cases Cæsarean section was performed.

Indications for Cæsarean Operation in Toxæmia.

The indications for Cæsarean section in toxæmia are as follows (Table VI).

TABLE VI.

Indication.	Group.			Total.
	1 to 500.	501 to 1000.	1001 to 1500.	
Toxæmia	1	—	2	3
Disproportion	—	2	1	3
Abnormal uterine action	—	—	1	1
Two previous stillbirths and mild toxæmia	—	—	1	1
Total	1	2	5	8

The cases of toxæmia have been classified into three groups, as follows: (*a*) mild—those responding rapidly to rest, sedation and salt restriction; (*b*) moderately severe—those requiring more severe sedation and diet restriction; often the toxæmia in these cases did not clear up completely until after the delivery; (*c*) severe—those requiring in addition intravenous therapy, possibly magnesium sulphate injections and at times active interference.

There were 61 mild cases, 23 moderately severe cases and 17 severe cases.

Investigation of the parity shows 57 *primiparæ*, 22 with second babies, and 10 with third babies. The remaining 12 were of parities from four up to as high as 11.

Age Groups in Toxæmia.

Table VII sets out the age groups in toxæmia.

TABLE VII.

Patients.	Years.						Total.
	15 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	40 to 45.	
Primiparæ	9	26	17	8	0	1	61
Multiparæ	0	1	17	11	6	4	39

In one case of mild toxæmia the age of the patient, a *primipara*, could not be traced.

The three patients with eclampsia were all *primiparæ*, aged twenty-two, twenty-five and twenty-six years respectively.

One patient with hyperemesis was a *primipara*, aged twenty-four years, and one, pregnant for the second time, was aged thirty-one years.

The one patient with hypertension was pregnant for the eleventh time, and was aged forty-three years.

One patient with chronic nephritis was pregnant for the second time and was aged thirty-three years; the other, pregnant for the third time, was aged thirty-four years.

ANTE-PARTUM HÆMORRHAGE.

There were 15 cases of ante-partum hæmorrhage (1% of the total number). Eleven were attributed to *placenta prævia* and four to accidental hæmorrhage.

Five of the patients with *placenta prævia* had marginal placentas and were delivered normally. The other six had Cæsarean section, with the loss of one baby in the neo-natal period. This baby died of hyaline membrane; it was caused, I think, by the presence of a fan in the operating theatre which, blowing on the baby during delivery, produced a premature inspiration.

Of the accidental hæmorrhages, three were revealed and one concealed.

The three patients with revealed hæmorrhage were toxæmic, but probably had low or marginal placentas as well; one of these babies was stillborn.

The concealed accidental hæmorrhage occurred in a patient pregnant for the second time, aged over forty years, six months pregnant and with a severe degree of toxæmia. The baby died *in utero* and was delivered *per vaginam*.

These two stillbirths are classified as due to toxæmia.

Post-Partum Hæmorrhage.

There were 21 patients with post-partum hæmorrhage, and six of these were given blood transfusions.

These patients include all in whose treatment special measures have been taken for hæmorrhage. I regard the giving of "Pitocin" and ergometrin as normal, but if the doses have to be repeated for blood loss, these cases are included among the post-partum hæmorrhages. Naturally, those in which intravenous drip administration of fluid or serum or blood transfusion were needed are included.

Manual Removal of the Placenta.

The placenta was removed manually 13 times, there being no untoward incidents associated with this procedure.

Cardiac Failure.

Four mothers developed acute cardiac failure. All mothers recovered, and three babies lived. The other baby died a few hours after delivery, being ten weeks premature.

These cardiac failures were each of a different type—right cardiac failure, acute pulmonary œdema of thyrotoxic origin, acute tachycardia and coronary occlusion.

It is thought that the prompt and prolonged administration of oxygen to the mothers did much to help the babies over the acute phase of these attacks.

Cerebral Complications.

One patient suffered a cerebral catastrophe during labour. It was an easy labour without toxæmia. The clinical appearance was not definite, but lumbar puncture revealed fresh blood at the time of the attack, and old blood at a later date. This patient recovered with no residual symptoms, and I made the diagnosis of subarachnoid hæmorrhage.

Stillbirth.

There were 24 (1·6%) stillbirths in this series. Of these infants 22 presented by the vertex and were so delivered. Two presented by the breech, one lying transversely with prolapsed arm and cord, internal version being performed.

Causes of Stillbirth.

The causes of stillbirth are shown in Table VIII.

The *placenta accreta* was a calcified fibrosed placenta, which was very difficult to remove manually. I attributed the still-birth to this cause.

In six cases of stillbirth, nothing which could be regarded as a cause was disclosed on careful examination.

In the cases of toxæmia in the mother, it was found that almost all were in severe toxæmia at six to seven months' gestation.

Neonatal Deaths.

There were 18 (1·2%) neonatal deaths. These were evenly divided, there being six cases in each of the three groups.

Causes of Neonatal Death.

The causes of neonatal death are set out in Table IX.

In the neonatal deaths, prematurity is the greatest cause. Lack of special cots and difficulty in obtaining oxygen caused the high mortality rate in the first group. The two babies in the last group were both ten weeks premature. The child which had the cord round the neck was born with asphyxia; it was alive, but could not be resuscitated.

Of the cases due to birth injury, one was a high, difficult forceps operation, and in retrospect I believe a wrong decision was made. This patient should have been delivered by Cæsarean section. Two cases were easy, normal deliveries, and one was an easy forceps delivery.

Table VIII.

Cause.	Group. 1 to 500.	Group. 501 to 1000.	Group. 1001 to 1500.	Total.
Placenta prævia	1	—	—	1
Hydrops fœtalis	1	—	—	1
Abnormality of fœtus	2	—	—	2
Prolapse of cord	2	1	—	3
Placenta accreta	—	1	—	1
Toxæmia (maternal)	3	3	1	7
Maternal dysentery	—	1	—	1
Cord tight round neck	—	1	—	1
Cord tight round elbow and knee	—	—	1	1
No cause discovered	1	2	3	6
Total	10	9	5	24

Congenital Fœtal Abnormality.

There were 17 babies with abnormalities, and of course several of these had more than one abnormality. Two were stillborn, four died in the neonatal period and two died at a greater age.

These abnormalities took the usual forms: harelip, cleft palate and talipes. Two babies had meningomyelocele, one anencephaly, and one, strangely enough, right-sided diaphragmatic hernia.

There was one "blue baby", with no cardiac sign; this child was found dead at two months. The post-mortem examination showed vomitus in the trachea, and a slightly patent *foramen ovale*. Tests for methæmoglobin gave negative results.

Table IX.

Cause.	Group. 1 to 500.	Group. 501 to 1000.	Group. 1001 to 1500.	Total.
Cord round neck	1	—	—	1
Prematurity	5	—	2	7
Birth injury, cerebral hæmorrhage	—	3	1	4
Post-maturity, shock	—	1	—	1
Atelectasis	—	1	—	1
Attenuated cord, baby marasmic	—	1	—	1
Abnormality in fœtus	—	—	2	2
Hyaline membrane (Cæsarean section)	—	—	1	1
Total	6	6	6	18

Other Features of Interest.

Four babies developed pyloric stenosis, two males (one a first baby, the other a second baby) developing severe symptoms about the tenth day. The Ramstedt operation was performed on both, and both recovered. The other two—one male (a second baby), one female (a third baby)—developed severe vomiting at eight weeks, and both were treated with "Eumydrin" and recovered. All diagnoses

were confirmed by X-ray examination. Two babies were born with teeth which, though soft at birth, soon hardened.

Three mothers developed a mild psychosis, which, however, cleared up on sedative treatment.

Blood Groups and the Rh Factor.

Blood and Rh grouping have been available for routine use only since July, 1951, so the numbers are small. Prior to that the Red Cross Blood Transfusion Service was ready and willing to do any special groupings sent down, and it still gives help and advice. I should like to pay a tribute to Dr. A. E. F. Shaw and his service for his very willing cooperation and helpful advice over the years to those in the country.

The blood groups were as follows: Group AB, 11; group A, 145; group B, 41; and group O, 175. Three hundred and eighteen subjects were RhD-positive and 54 RhD-negative.

One baby was stillborn with *hydrops fœtalis* in 1948. A specimen of the mother's blood taken about one week *post partum* had an antibody titre of one in 64. She has since had a normal child who was RhD-negative.

Icterus gravis was present in five babies. One was treated by three ordinary transfusions and the other four by exchange transfusions. The least number of transfusions (including exchange) was two, the greatest four. One mother in this series has had two babies, and both had exchange transfusions. All these five babies lived.

It may be of interest to record that in 1936 a baby with *icterus gravis* was treated with four small transfusions through the anterior fontanelle; three were from the one donor, who subsequently proved to be Rh-positive. This baby died. In 1941 another case was diagnosed; the baby was given two much larger transfusions from one donor by the saphenous route, and this baby recovered. Both these babies had deep jaundice, and their red cell counts were about 1,500,000 per cubic millimetre before treatment commenced. Of course, I knew nothing of the Rh factor at that time.

Cases of hæmorrhagic disease of the newborn were three in number. One baby was treated with vitamin *K*, the other two were treated with vitamin *K* and intramuscular injections of whole blood, and all recovered. All the mothers had been given vitamin *K* on their admission to hospital, as a matter of routine. However, quick labour gives little time for it to be effective.

Conclusions.

My experience has proved to me the soundness of the teachings in obstetrics. Over twenty-five years the advances have been great, more particularly in improved methods of delivery and in the application of intravenous therapy. This has necessitated considerable study, and I would advise the young practitioner to keep his text-books up to date and to read them. When one is presented with a *fait accompli* during labour, it is too late to start one's reading.

Osler once said: "There are more things missed through not looking than not knowing." This is very applicable to ante-natal care. However busy you may be, a careful check of the essentials must be made. I started regular weighing before the war, and gave it up, as I did not think that I received any help from it. After the first 500 of this series, I realized that I was being caught too often, and I commenced regular weighing again, and now I find it a valuable aid.

The lie should be checked frequently. Usually this is simple enough, but now and then it is easy to be misled, for a breech presentation can be very like a vertex presentation, especially in a short, fat, nervous patient. If the heart sounds seem a little high, X-ray examination will settle the question, and the unexpected breech presentation will be a rarity. It is my belief that babies rarely turn just before, or early in, labour.

An old teacher of ours in Melbourne always insisted that "art and not strength" is the basis of obstetrics. How true that is! I can remember twenty years ago after a "high forceps" operation with a floating head, due to disproportion, how proud one felt on the production of a living child, the obstetrician and the mother both being exhausted. The obstetrician always recovered, the mother never did completely. Intelligent anticipation is the watchword in avoiding these difficulties, and early induction of labour will solve this problem, if the disproportion is not too great.

Any history of obstetric difficulty in sisters or mother should be given due weight. Some extraordinary histories occur occasionally. Think about them, as they warrant study. I had one patient with a history of six successive babies having died at three months with gastroenteritis; this child, her seventh, repeated this disaster.

My father used to tell me: "When you feel like interfering in a normal breech delivery, go for a long walk." Sound advice.

I have forceps always ready in a breech presentation. The application of forceps to an after-coming head is an easy procedure, and with episiotomy may make all the difference to a distressed child if cord compression has been severe. I have found the Lovsett technique a valuable aid.

Give every baby a chance, persist with resuscitation, and you will occasionally be rewarded by recovery in a seemingly hopeless case. The administration of oxygen to the mother is resuscitation to the unborn child.

"Is this journey really necessary?", a war-time slogan, applies to Cæsarean section. "Is this Cæsarean really necessary? Or am I taking the easy way out?" is a question which should be considered on each occasion. If this is done, your Cæsarean section rate should be reasonable.

"The price of liberty is eternal vigilance", the motto of the Returned Sailors, Soldiers and Airmen's Imperial League of Australia, is a good one for toxæmia. Eternal vigilance is necessary if you are to avoid disaster.

I have had one case of eclampsia since this series finished, after 679 cases of freedom from this condition. A *primipara* was admitted to hospital with the diagnosis of preeclampsia. After treatment, when her blood pressure and urine were normal and the œdema had gone, this woman came into labour and had four fits. My point is that, however well these patients appear to be, an occasional patient will rapidly deteriorate on coming into labour.

Placenta prævia has been robbed of at least some of its terrors by Cæsarean section and blood transfusion, but post-partum hæmorrhage can still be terrifying. A recent patient, since this series, needed 15 pints of blood and four pints of serum, and subtotal hysterectomy, to stop the hæmorrhage. Both mother and child recovered. That is the only occasion on which I have had to perform a subtotal hysterectomy for post-partum hæmorrhage.

The art of obstetrics has a scientific basis, and this basis is the foundation stone of sound obstetric practice.

Acknowledgements.

I would like to acknowledge a debt of gratitude to Professor J. Shedden Adam, who read this paper before publication, for his helpful advice and criticism. I should also like to thank Professor Bruce Mayes for his "Practical Obstetrics", a great source of comfort and help in time of stress, and my receptionist, Miss Daphne Boyle, for help in the careful recording of these cases.

PRIMARY TUBERCULOSIS OF THE VERMIFORM APPENDIX.

By Thomas F. Rose.

From the Department of Surgery, Royal North Shore Hospital of Sydney.

The term "primary" is applied to tuberculosis of the appendix when it apparently arises *de novo* in that organ. How the bacilli reach the appendix is uncertain. Whether, ingested in the food, they are carried in the contents of the alimentary canal, or whether they travel in the blood-stream from some tiny focus undiscoverable even at autopsy, is unknown.

Incidence.

The incidence of primary tuberculous appendicitis is hard to assess unless every appendix is examined histologically when removed. This is because there may be very little evidence of its presence even when the appendix is viewed at operation.

In the past twenty years there have been seven known patients with primary tuberculosis of the appendix at the Royal North Shore Hospital. In only one instance was the lesion confined to the appendix (Case I). In another (Case II) the draining lymph nodes were affected as well. In the other five cases the caecum adjacent to the base of the appendix was involved.

During this time, too, at the hospital, there was one other case of tuberculosis of the appendix, obviously secondary to advanced "open" pulmonary tuberculosis which had infected the contents of the alimentary canal. There were also 14 instances of intestinal tuberculosis without involvement of the appendix.

Conde (1949) found nine instances of tuberculosis of the appendix in 2625 appendicectomies, but he did not state whether the disease was primary or secondary. In a series of 39 cases reported by Ficara and Paolantonia (1946) there was only one instance of a primary infection. (It is interesting to note, *en passant*, that this large series from Italy occurred in only 239 appendicectomies.) Morrison, Mixter, Schlesinger and Ober (1952) had four primary cases in 35 cases of intestinal tuberculosis.

Pathology.

Typical tubercles first appear in the mucosa and submucosa of the appendix. Macroscopically, at this stage, the organ may appear normal or be a little thickened or injected.

Later, the infection spreads through the muscle coat to the serosa, when the tubercles can be seen with the naked eye. Occasionally a hypertrophic response occurs in all coats of the appendix, which becomes very enlarged and thickened and is easily recognizable (Cases V and VI).

At any time the infection may spread by the lymphatics to the draining ileo-colic lymph nodes. The significance of these enlarged nodes may be missed if the appendix appears normal (Case II).

The infection may spread directly to the caecum, where the portion round the appendiceal base is first affected (Cases III to VII). This area is thickened, and tubercles are seen on macroscopic examination.

Symptomatology.

Symptoms implicating the appendix at any of these stages are minimal, and indeed the patient is usually symptom-free. Exploration of the abdomen for some other condition may result in the recognition of this disease by the finding of serosal tubercles or the hypertrophic form of appendiceal infection. More often than not the appendix appears normal at such an operation, and it is removed and examined only as a routine measure. The pathologist will then reveal the true nature of the lesion to the astonished surgeon.

Should the affected mucosa become swollen, or fibrosis ensue, or a fæcolith occur in the lumen, as it may at any stage, then the patient will suffer from recurrent appendicular colic. There may be no abnormal physical findings, or there may be a little tenderness over the appendix, which perhaps does not fill with barium on radiological examination.

Should the lumen of the appendix become occluded by such a fæcolith, then acute obstructive appendicitis with all its sequelæ will ensue (Cases I, II, III, IV and VII). Clinically the patient is diagnosed as suffering from acute appendicitis, the commonest method of presentation of tuberculous appendicitis to the clinician. At operation, in such a case, if the tuberculous infection is still localized to the appendix and no subserous tubercles are visible, the appearance of the organ is no different from that of the usual type of acutely inflamed or gangrenous appendix (Case I), and unless the appendix is examined histologically the underlying tuberculosis will be missed. However, should the infection have spread to the caecum, then the diagnosis is easily made (Cases III, IV and V).

On microscopic examination of the appendix the pathologist will find not only the evidence of the acute non-specific inflammation and necrosis, but also the typical tubercles of tuberculosis. However, it is unusual for him to find tubercle bacilli in the stained section or on attempted culture from the appendix or fæces in these cases.

Diagnosis.

Pre-operative diagnosis of a primary tuberculous infection of the appendix is virtually impossible, and in no instance in this series was it made. Two patients (Cases V and VI) were diagnosed as suffering from recurrent appendicular colic, which was confirmed by X-ray examination, an opaque enema failing to fill the appendix. The other five patients were all correctly diagnosed as suffering from acute appendicitis, though the underlying tuberculous infection was not suspected.

Diagnosis at operation depends on the macroscopic appearance of the appendix and caecum (if the latter is infected). Cases I and II were diagnosed as ordinary acute appendicitis, the significance of the enlarged draining lymph nodes in the latter not being realized. Cases III, IV and VII were again diagnosed as acute appendicitis, but it was realized also that the adjacent caecum was infected by tuberculosis from the apparently innocuous appendix. In Cases V and VI the patients were recognized as having hypertrophic tuberculosis of the appendix with caecal involvement.

All the appendices were submitted to the pathologist and the characteristic tubercles were found in every instance, though the organism was not able to be isolated.

Age and Sex.

There were six males and one female. Their ages ranged from nineteen to forty years.

Surgical Treatment and Prognosis.

This series, though small in number, illustrates the effect of surgical treatment in the progress and outcome of this disease.

When the lesion is confined to the appendix, appendicectomy alone suffices, as is shown in Case I; this patient is alive and well some seven years afterwards. In similar fashion, Kini (1942) reported a patient who was well seven years after appendicectomy. Royster's (1927) patient died of intercurrent disease after fifteen years of good health. Morrison *et alii* (1952) had four patients alive and well for periods varying from nine months to fifteen years after appendicectomy.

When the lesion has spread beyond the appendix into the caecum or the draining lymph nodes, then nothing less than a right hemicolectomy with node removal is required. If this eradicates the lesion the outlook is excellent (Menon and Anguli, 1949). This was so even before the days of the antituberculosis drugs, as is shown in Cases V and VI; these patients were alive and well four years after a hemicolectomy, even though they did not have the benefit of streptomycin.

The resection should be performed when the lesion is recognized at the primary operation as having spread beyond the appendix, as in Cases V and VI. However, should the case present as acute appendicitis with perforation or widespread peritoneal inflammation, then appendicectomy only may be first performed, provided that as soon as the diagnosis is confirmed by the pathologist, a hemicolectomy is carried out to prevent the complications that occurred in Cases II, III, IV and VII, as described below, in which hemicolectomy was not performed.

In Case II the disease had spread to the draining lymph-nodes, as in a case described by Koster and Kasman (1934). Death occurred two months later from tuberculous peritonitis due to caseation and breakdown of the affected nodes.

In Case III, with involvement of the adjacent caecum, death occurred quickly from general peritonitis due to *Bacterium coli* from rupture of the appendiceal stump, which allowed the caecal contents to escape into the general peritoneal cavity.

In Case IV the caecum and the terminal portion of the ileum were involved by direct spread from the adjacent appendix. Six months after appendicectomy death occurred from intestinal obstruction and fistulæ due to rupture of caseous tuberculous deposits in the bowel.

In Case VII, though the caecum was involved round the appendiceal base, appendicectomy only was performed. This was followed by intensive streptomycin therapy. However, within twelve months, increasing large bowel obstruction was occurring from a stricture at the commencement of the colon. Hemicolectomy was recommended, but the patient had still refused operative intervention when last heard of.

No conclusion can be drawn from this series regarding the ancillary use of the specific antituberculosis drugs, as only Cases I and VII have occurred since their advent. In Case I streptomycin only was used for the three weeks after operation, as the patient developed an obvious *Bacterium coli* wound infection; but it was feared that there might be a tuberculous basis in its causation. However, the wound healed soundly within three weeks, and the infection was obviously not tuberculous. In Case VII intensive streptomycin therapy followed operation; but a fibrous stricture of the ascending colon ensued as described above.

Reports of Cases.

The seven cases from the Royal North Shore Hospital are here described. One patient (Case I) was treated by myself, and a second (Case VII) was examined in consultation one year after appendicectomy when obstruction was supervening. The other cases were abstracted from the hospital records.

In those cases presenting as acute appendicitis (Cases I, II, III, IV and VII), the macroscopic appearance of the appendix was that of ordinary acute inflammation only. In each instance histological examination of the appendix or removed caecum revealed the typical tubercles of tuberculosis; this finding is sufficient to diagnose a tuberculous infection, even though the bacilli are not isolated on staining or attempted culture (Aylett, 1954). Tubercle bacilli were isolated in only one case (Case II), in which they were grown on culture from the fæces shortly before the patient's death two months after appendicectomy. In Cases I, II, III, IV and VII microscopic examination showed as well the superimposed acute non-specific inflammation of the appendix.

Case I.—The patient was a youth, aged nineteen years, who had been in good health until six months before his admission to hospital. He then suffered attacks of mild periumbilical pain at irregular intervals. Six months before his admission the pain became severe and made him vomit. The pain then radiated to the right iliac fossa, where it became localized. Examination of the patient revealed tenderness and rigidity in the right iliac fossa.

At operation the appendix was found to be covered with adhesions. It was thickened, red and inflamed. It was perforated at its base just distal to an impacted fæcolith. The caecum appeared normal. Appendicectomy was performed.

Convalescence was complicated by a wound infection from which *Bact. coli* were isolated. Streptomycin, 0·5 gramme daily, was given for twenty-one days in case the abscess had a tuberculous basis. However, it healed in twenty-one days and the patient was discharged with the wound healed. A follow-up extending over seven years showed that the patient was well, with a normal wound. There had been no abdominal symptoms during this time.

Case II.—This patient, a male, aged twenty-two years, had a history of twelve hours of irregular attacks of abdominal pain of increasing intensity, which commenced in the epigastrium and radiated to the right iliac fossa. Examination of the patient revealed tenderness in the right iliac fossa with muscle rigidity.

Operation disclosed an acutely inflamed appendix whose lumen was obstructed by a fæcolith. It was full of pus from which *Bact. coli* was grown on culture. The caecum was normal, but the lower group of ileo-colic lymph nodes were enlarged. Their significance was apparently not realized, as appendicectomy only was performed.

The patient's convalescence was unsatisfactory and he died two months later of tuberculous peritonitis, which autopsy demonstrated as arising from the enlarged lymph nodes previously seen, which were now caseating. These had ruptured into the peritoneal cavity and also into the lumen of the ileum—the reason why tubercle bacilli were grown on culture from the fæces shortly before his death. Histological examination of the nodes revealed tuberculous infection.

Case III.—This female patient, aged forty years, had twenty hours' abdominal pain, commencing in the epigastrium and radiating to the right iliac fossa. This pain was increasing in intensity. Examination of the patient disclosed tenderness and rigidity in the right iliac fossa.

Operation showed what seemed to be an ordinary acutely inflamed appendix with a fæcolith obstructing its base. It was noticed that the caecum adjoining the base of the appendix was thickened and had small subserous tubercles on it. Appendicectomy only was performed.

The patient died some ten days later of *Bact. coli* peritonitis due to rupture of the invaginated base of the appendix into the general peritoneal cavity. Histological examination of the affected part of the caecum revealed typical tubercles.

Case IV.—This male patient, aged thirty years, had abdominal pain for ten hours, localized to the right iliac fossa, where tenderness and rigidity were present.

Operation revealed an appendix which was gangrenous, but not yet ruptured, owing to occlusion of the base by a fæcolith. There was no evidence of tuberculosis of the appendix itself, but the caecum adjacent to its base was thickened and had tubercles on it. The appendix was also applied to the terminal portion of the ileum, which had the same appearance as the caecum. Appendicectomy only was performed.

Six months later, after three months' illness, the patient died of chronic small bowel obstruction and fistulæ involving the terminal portion of the ileum and the caecum, which were the seat of advanced tuberculosis.

Case V.—This male patient, aged thirty-five years, had a history of twelve months' recurrent pain in the right iliac fossa. Examination disclosed only some tenderness there. X-ray examination by means of a barium enema showed that the appendix did not fill, and there was tenderness on pressure over the caecum.

Operation revealed hypertrophic tuberculosis of the appendix with involvement of the caecum round the appendiceal base. A right hemicolectomy was performed, and a follow-up examination four years later revealed that the patient was well.

Case VI.—This patient was a male, aged forty years. The case was similar in all respects to Case V, except that the history extended over two years.

Case VII.—This male, aged forty years, had a history of six months' mild recurrent pain in the right iliac fossa culminating in an attack of acute appendicitis.

Operation revealed what appeared to be an ordinary acutely inflamed appendix; but the anterior aspect of the caecum was thickened and there were some subserous tubercles on it. Appendicectomy only was performed, and the patient was given a long course of streptomycin therapy. He was well for some six months, but then generalized colicky abdominal pains occurred with attacks of abdominal distension. X-ray examination with a barium enema then showed a constant constriction of the commencement of the ascending colon. This was almost certainly a tuberculous stricture.

The patient was advised to undergo a hemicolectomy twelve months after his appendix was removed, but he refused operation and has since been lost sight of.

Summary.

Primary tuberculosis of the appendix is discussed and illustrated by seven case records.

The difficulties of diagnosis, even at operation, are assessed, and it is pointed out that, unless all excised appendices are examined histologically, many instances of primary tuberculosis of the appendix will be missed.

Treatment by appendicectomy is sufficient for those patients in whom the infection is localized to the appendix. This was followed by good results even in the days before the specific antituberculosis drugs were introduced.

When the lesion has progressed beyond the appendix, a right hemicolectomy with removal of lymph nodes must be performed. Provided that the lesion can thus be entirely excised, the prognosis is good even without the ancillary aid of the antituberculosis drugs. One case (Case VII) illustrates the fact that incomplete surgery, even though aided by these drugs, still leads to complications requiring later surgery.

Acknowledgement.

I wish to thank Dr. Wallace Freeborn, the General Medical Superintendent of the Royal North Shore Hospital of Sydney, for permission to examine the relevant records.

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"LARGACTIL" IN PSYCHIATRY.[1]

By R. RAMSAY WEBB,

Receiving House, Royal Park, Victoria.

To determine the value of a particular therapeutic measure is often difficult, and this applies especially in psychiatry, in which diagnostic criteria are relatively vague and subjective, and the tendency to spontaneous recovery is so difficult to assess.

In the case of "Largactil" the position is further complicated because, although "Largactil" has been used in almost every psychiatric illness, it is not yet clear whether the drug is a purely symptomatic remedy or whether it has any curative effect on the cause of mental illness.

Chlorpromazine or "Largactil" is a derivative of phenothiazine and is allied to antihistamines such as "Phenergan"; its own antihistamine action is slight. It was developed in France during research into potentiating agents in general anæsthesia and is used in the artificial hibernation treatment of shock.

So, like muscular relaxants, which have proved such a boon in psychiatry, "Largactil" was borrowed by the psychiatrist from the anæsthetist, and in reasonable doses "Largactil" can be as safely administered by the psychiatrist as can muscular relaxants.

The Physiological Effects.

The reported physiological effects are numerous and at first sight rather alarming—actually they are often at variance with the clinical manifestations.

1. Changes in body temperature do not seem very constant, and the reported hypothermia is often not seen; in fact the temperature chart usually looks normal. On occasions a moderate pyrexia develops and this seems to be due to the "Largactil" itself.

2. The reported fall in blood pressure is usually not great, and syncopal attacks, which have been described as a hazard, seem uncommon.

3. Tachycardia is quite common, many patients complaining of palpitations. This seems of little importance.

4. Dryness of the mouth is a common complaint. It seems a minor disability, but it has been claimed that it may lead to upper respiratory tract infection.

5. Nausea and even vomiting may occur. This seems strange since the drug is reported to be a powerful antiemetic. Nausea is no indication for stopping the treatment.

6. "Largactil" is reported to have a potentiating effect on other drugs, especially hypnotics. This will be mentioned later.

7. Jaundice is by no means uncommon in patients taking "Largactil". Only a small proportion of "Largactil" administered is excreted; most of it is metabolized and the liver bears the brunt of this. It would seem, however, that the risk of serious liver damage is slight, as patients who develop jaundice are not very ill, and the condition clears rapidly when the treatment is stopped.

8. One of the most important effects of "Largactil" is its depressant action on the central nervous system, resulting in varying degrees of drowsiness. With large doses there is a considerable degree of drowsiness, and even acutely disturbed and refractory patients can be soothed in a most gratifying manner. Such patients are drowsy and rather apathetic, but remain quite acessible to questioning and show nothing of the clouding of consciousness seen after the administration of barbiturates and hyoscine. This ability of "Largactil" to produce sedation without confusion or loss of consciousness is in my mind its greatest value. It has been described by Lehmann and Hanrahan in the *A.M.A. Archives of Neurology and Psychiatry* of February, 1954. These workers administered a battery of psychological tests to an experimental group before and after giving them barbiturates, and they found that barbiturates produced a definite deterioration in test performance. When the tests were administered before and after the taking of "Largactil", there was an actual improvement in test performance. This certainly supports one's clinical impression—it is striking how a patient who is drowsy from the effects of "Largactil" retains his awareness and accessibility.

9. There are numerous other physiological effects which seem unimportant clinically.

Dosage.

The effective dose and the safe maximum period of administration have still not been determined. The drug is supplied by May and Baker (Australia) Proprietary, Limited in tablets of 25 milligrammes for oral use, and ampoules of 50 milligrammes for intramuscular injection. There seems little doubt that the intramuscular route is more effective that the oral. Intravenous administration is usually frowned on.

In out-patient practice the oral route must be used, and the dose may vary from 75 to 100 milligrammes daily to 300 milligrammes daily. It seems safe to begin with 50 milligrammes three times a day, then after one week to reduce the dosage to 25 milligrammes three times a day.

With patients in hospital it seems desirable to employ both oral and intramuscular routes, but reports on the optimum dosage vary considerably. Our usual practice is to begin with 100 milligrammes intramuscularly twice a day *plus* 100 milligrammes orally twice a day—that is, a total of 400 milligrammes daily. After the first week the intramuscular injections are stopped, and the oral administration is continued for about one month or longer. The patient may be given smaller maintenance doses after being discharged from hospital.

The question as to how long such patients may be given "Largactil" is important, because undoubtedly some relapse after withdrawal of the drug, and problems of cumulative effect and addiction may arise. I have seen one patient

[1] Read at a meeting of the Victorian Branch of the Australasian Association of Psychiatrists on November 29, 1954.

receiving maintenance doses for four months without ill effects.

There is a difference of opinion as to whether one should start with smaller doses and increase them, or give larger doses from the outset. I myself believe that it is preferable to start with larger doses, of the order named (400 milligrammes daily). This dosage rapidly produces physiological effects such as drowsiness, dizziness and dryness of the mouth, and seems to produce a rapid amelioration of symptoms. The dose can then be reduced, preferably by omission of the intramuscular injections.

Nursing Care.

With the smaller doses used in out-patient practice, a warning about the risk of jaundice would seem to be the only precaution necessary. Emphasis on palpitations *et cetera* would seem undesirable.

With the larger doses which I think are desirable, but which can be given only to in-patients, we have developed the following procedure.

For the first week the patient is kept in bed and given 100 milligrammes intramuscularly twice a day, *plus* 100 milligrammes orally twice a day. The injections should be given at varied sites because they are painful, and the "Largactil" should be diluted with procaine solution or distilled water.

Liver function tests are carried out at the beginning of treatment, and temperature and blood pressure recorded morning and night. The members of the staff are warned about the potentiating effect on hypnotics.

After the first week the patient is allowed out of bed, and if possible the injections are stopped and the drug is continued by mouth alone until the maximum clinical improvement is reached.

Complications.

Serious complications seem rare and we have now abandoned routine liver function tests, and temperature and blood pressure are recorded only for the first week. I doubt if this is really necessary.

I have heard of one serious syncopal attack, but have not seen one. Such attacks should apparently be treated by posture alone, since drugs such as "Coramine" and "Cardiazol" are reported to produce fits. This is in spite of the fact that "Largactil" has been described as an anticonvulsant. Many patients become giddy and mildly ataxic, and therefore should be nursed in bed when receiving larger doses.

The potentiating effect on hypnotics seems exaggerated. Usually hypnotics are not needed, but if necessary usual doses of barbiturates may be given with safety.

Similarly electric treatment can safely be given to patients having "Largactil", but if a relaxant is used it should be remembered that the anti-acetylcholine type is reported to be potentiated. The depolarizing type of relaxant such as "Brevidil E"—which is now used exclusively in this hospital—is not potentiated.

If thiopentone is used as a preliminary to the relaxant—a practice which I think is undesirable—the possibility of potentiation should be remembered.

Allergic manifestations may occur. Asthma has been reported as a frequent complication, but in my experience it is rare. Urticarial rashes are more common, and a diffuse papular pruritic type of rash is common and troublesome.

The pain of the injection seems exaggerated, but many patients develop hard, round, deep-seated lumps at the site of the injection, although actual ulceration is rare. For this reason the injections, although desirable initially, should not be continued longer than necessary. It has been suggested that "Hyalase" might lessen the incidence of these areas of induration.

Jaundice in my experience does not give much cause for alarm, but it is well to remember that the only two patients who have died had preexisting liver disease. One was a patient with *delirium tremens* who at post-mortem examination was found to have cirrhosis of the liver, and the other had congestive heart failure and at post-mortem examination a nutmeg liver was found.

It would seem that any suspicion of impaired liver function is a contraindication to "Largactil"—it would also seem that this is the only contraindication.

Indications and Results.

Neuroses.

My experience of the treatment of neurosis is limited to some 15 cases. I have seen good results in two cases of hysteria—the patient being the type of woman with numerous somatic complaints obviously related to some domestic difficulty. These patients tend to relapse when the treatment is stopped. A chronic anxiety state of years' standing seems to be relieved. Chronic neurotic depression appears greatly benefited.

Apart from these four cases the remaining 11 patients showed no benefit. None was made worse. It is only fair to state that many of these patients were confirmed neurotics who presented an almost impossible therapeutic problem.

Psychoses.

Provided there is no liver disease, "Largactil" can be given in any type of psychotic illness, and we have in fact used it in all types of psychosis; any type may show benefit.

Its greatest value to my mind is its unique sedative effect, and this fact has largely determined the type of patient we have treated. When a patient is admitted to hospital in a really disturbed state it is quite obvious that his excitement must be controlled. To date our only means of dealing with such cases of excitement has been by using electric treatment or large doses of sedatives. Electric treatment controls disturbed patients very well, but it may be necessary to repeat it three or four times a day till the patient settles down, and this precludes adequate psychiatric examination. So one is sometimes confronted with the situation in which the patient has recovered from a psychosis which has never been diagnosed. This is bad psychiatry and seems to be comparable to giving morphine to a patient with an acute abdominal condition before a diagnosis has been made.

Similarly with morphine and hyoscine—the patient snores away in a completely inaccessible state. The intramuscular administration of paraldehyde has the same disadvantage, apart from its tendency to produce such horrible abscesses. In my opinion the intramuscular use of paraldehyde should be abandoned.

With "Largactil" used as a sedative the picture is very different. A disturbed patient who is given, say, 200 milligrammes intramuscularly will usually lie quietly in bed within quite a short time, about ten to fifteen minutes. He is drowsy, but as was previously mentioned he is quite accessible, and the delusions or hallucinations or other symptoms are untouched by the "Largactil" and can be examined at leisure. Sometimes only the motor restlessness is controlled and the patient will remain quietly in bed, but continue talking with a schizophrenic jumble, flight of ideas, *et cetera*. On occasions the initial dose of 200 milligrammes has to be repeated two or three times before the patient is soothed properly. In my experience it is rare for "Largactil" used in this way as a sedative to fail, and it means that we can now control disturbed patients without obliterating the symptoms necessary to make a diagnosis.

In the female wards at this hospital we have treated some hundred patients with "Largactil", and many of them have been "selected" on the basis of disturbed conduct; that is, they were admitted in a disturbed state and given "Largactil" as a sedative. Such disturbed patients may be "held" for a few days under treatment with "Largactil" until some other treatment can be given, so that many of them have had "Largactil" *plus* some other treatment and it is impossible to assess results in terms of remission percentages. It has been claimed that a

patient given "Largactil" *plus* electric treatment does better than one given electric treatment alone, and I have sometimes had the feeling that this is so.

A few patients have improved so rapidly with "Largactil" while waiting for some other treatment, that the "Largactil" was continued alone, and they seem to have had a complete remission of their psychosis.

Other patients were selected from the outset for a course of "Largactil" treatment, and so it is possible to divide the treated patients into three groups, as follows:

1. When the "Largactil" was used purely for its sedative effect I have no doubt of its value and I believe, if only for this reason, that "Largactil" has come to stay. We have used it as a sedative for almost all types of disturbed psychotics—those with acute mania, schizophrenia, senile confusion, other organic confusions, epilepsy, *et cetera*.

2. A second group in which the patient taking "Largactil" was transferred to another form of treatment—any assessment of the combined therapy is subjective and difficult.

3. Thirdly, there is a better-defined group consisting of the remaining 32 patients. This group includes those who responded so well to sedative doses of "Largactil" that the treatment was continued alone, and those patients who were initially put on a planned course of "Largactil"; that is, a group who had had no other treatment, or had failed to respond to some previous treatment, and whose recovery —if any—coincided with the administration of "Largactil" alone. There were 32 such patients, and of these 14 made a good recovery and 18 showed sedative effect only or failed to respond. Thus of this group of 32 patients, 14 responded in a way that suggests that "Largactil" had some actual curative effect on the psychosis. Of these 14 patients who apparently recovered, seven were schizophrenic, six had affective psychoses, and the condition of one was undiagnosed. Some of these good results occurred in patients who I consider would have recovered without any treatment, but some were quite impressive cases, and three seem worthy of brief mention.

CASE I.—A typical paraphrenic woman was hallucinated, deluded and suspicious, and was given electric treatment on admission to hospital, without improvement. She was then given "Largactil" in doses of 50 milligrammes intramuscularly twice a day, and 50 milligrammes orally twice a day, made an excellent recovery, and was discharged from hospital.

CASE II.—A schizophrenic woman of dubious intelligence was quite disturbed and was given electric treatment without result. She was given "Largactil" and was improving when for administrative reasons the treatment had to be stopped. Within two days she had relapsed completely; "Largactil" was then resumed, and she made an uninterrupted recovery and was discharged from hospital.

CASE III.—A young schizophrenic girl, admitted to hospital in a state of katatonic excitement, had previously had electric treatment. She was given "Largactil", 100 milligrammes intramuscularly twice a day and 100 milligrammes orally twice a day, rapidly recovered, and was discharged from hospital.

I am not suggesting that these figures or these cases prove anything. In fact it seems to me that until we can agree on elementary matters such as diagnosis and assessment of symptoms, anything in the nature of proof is impossible. However, I have been very impressed with the effect of "Largactil" in some of these cases.

Insulin Treatment.

The hypoglycæmic restlessness of patients undergoing full coma insulin treatment constitutes a major nursing problem which I believe has been completely solved by the advent of "Largactil".

"Largactil" given in doses of 100 milligrammes intramuscularly one hour or more after the injection of insulin produces a complete transformation in an insulin unit.

Conclusions.

1. The sedative value of "Largactil" for disturbed psychotics is no longer in doubt.

2. Its value in controlling hypoglycæmic restlessness in an insulin unit is also beyond question.

3. The value of "Largactil" in combination with other treatments is very difficult to assess.

4. The value of "Largactil" as a treatment *per se* is still *sub judice*, but is well worth further investigation.

Acknowledgement.

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THE ISOLATION OF A RICKETTSIA RESEMBLING *RICKETTSIA AUSTRALIS* IN SOUTH-EAST QUEENSLAND.

By J. H. POPE,

Queensland Institute of Medical Research, Brisbane.

ANDREW *et alii* (1946) reported the isolation of two strains of rickettsiæ from two of 12 North Queensland patients considered to be suffering from tick typhus. Agglutination of patients' convalescent serum with *Proteus* OX19 was a notable feature of the disease; but complement-fixation tests revealed a clear-cut distinction between *Rickettsia mooseri* and the rickettsia isolated from North Queensland tick typhus (Funder and Jackson, 1946). Subsequently serological differences were demonstrated between the rickettsia of North Queensland tick typhus and those of a number of other well-recognized rickettsioses (Plotz *et alii*, 1946; Lackman and Parker, 1948), and it was concluded that this rickettsia was probably a new ætiological agent within the spotted fever group. The name *Rickettsia australis* was proposed in 1950 by Philip (cited by Philip, 1953).

Since 1946 there have occurred in south-east Queensland three cases which have been diagnosed clinically and serologically as tick typhus, but no isolations of rickettsiæ have been made.

This paper reports the isolation of a rickettsia resembling *R. australis* from a patient probably suffering from tick typhus. The case history of the patient has been recorded by Neilson (1955).

Inoculation of Mice.

Blood from the patient, J.C., was collected by Dr. G. H. Neilson on September 21, 1954, and forwarded to this laboratory. The clot was immediately ground, suspended in saline, and inoculated intraperitoneally into six weaned mice, which were examined at seven and fourteen days in groups of three. Serial seven-day and fourteen-day passages respectively were initiated from these mice. In all passages, livers and spleens of the mice were suspended in saline and inoculated intraperitoneally.

The seven-day series of passages led to the isolation of the rickettsia. One of the three first-passage mice examined at seven days had a slightly enlarged spleen. Each of the four second-passage mice had an enlarged spleen and a small quantity of viscous peritoneal fluid, but no rickettsiæ were seen in Giemsa-stained smears of the fluid. In the third passage intracytoplasmic rickettsiæ were seen in the peritoneal fluid. In the following passages, peritoneal fluid was always present in small quantities, and splenomegaly was common. Of 94 mice of the third to the eleventh passages examined, rickettsiæ were demonstrated in 13, while 34 showed splenomegaly. The incidence of splenomegaly might have been higher if the mice had been examined later than at seven days. Clinical signs of illness in the mice were minimal, occasional slight hunching of the back and ruffling of the coat at four to seven days being the only signs observed. Of 65 mice of the third to the eleventh passages inoculated with infective material and observed for at least thirty days, only three died, and two of these were found to be suffering from bacterial infection. The mortality of this rickettsial disease in

mice is therefore negligible. Attempted culture from spleens on blood agar medium gave consistently negative results.

One of the first-passage mice examined at fourteen days had a thick splenic exudate, in which no rickettsiæ were seen. Three passages were made at fourteen-day intervals, but no signs of infection appeared in the mice.

A sample of the patient's urine was inoculated into six weaned mice. Four seven-day passages and three fourteen-day passages were made in the manner already described, but no rickettsia was isolated.

Inoculation of Guinea-Pigs.

Blood from the patient was inoculated intraperitoneally into three male guinea-pigs, none of which became febrile or showed any scrotal reaction. Two were killed, and ten serial passages were made at intervals of five to ten days. In each of eight passages, at least one animal showed a slight febrile reaction between five and seven days after inoculation. Often the temperature was raised on one day only. Successive passages failed to produce a more consistent reaction in inoculated guinea-pigs. Convalescent serum from ten guinea-pigs of the first eight passages was tested for complement fixation against *R. akari*, *R. mooseri* and *Coxiella burneti*. Five of the ten sera showed positive complement fixation against *R. akari* (see Table I), and this, together with the slight febrile response, suggests that possibly a mild infection was present in the guinea-pigs, but it failed to become established.

TABLE I.
Examination of Guinea-pig Serum.

Passage.	Complement Fixation Reciprocal Titres.		
	R. akari.	*R. mooseri.*	*C. burneti.*
1	8	–	–
2	16, –	–, –	–, –
3	–	–	–
4	–	–	–
5	8	–	–
6	8, –	–, –	–, –
7	8	–	–
8	–	–	–

Urine from the patient was inoculated intraperitoneally into two guinea-pigs, and one blind passage was made, but none of the animals became febrile.

Infective material from mice of the third passage was used to inoculate intraperitoneally two male guinea-pigs weighing 470 and 275 grammes. The larger animal became febrile (a rectal temperature of 104° F. being considered abnormal) on the fifth day after inoculation, and remained so on the sixth day, when it was killed for passage. On both days a severe scrotal reaction was also present, with obvious swelling and inflammation of the scrotum and fixation of the testes within it. At autopsy, there was severe inflammation of the surface of the testes, which were completely adherent to the swollen scrotum. No rickettsiæ were seen in Giemsa-stained smears of the tunica. The spleen was not enlarged, and no growth occurred when culture from it was attempted on blood agar. The smaller guinea-pig (1172) was febrile on the sixth day only, when a less severe scrotal reaction became apparent and remained till the eighth day.

In the two second-passage male guinea-pigs, the scrotal reaction appeared on the fifth day, and the mild febrile periods commenced on the fifth and sixth days. The scrotal reaction remained until the ninth day and the febrile period until the seventh day in the animal (1174) left for observation. An autopsy was performed on one guinea-pig during the febrile period, and the appearance of the testes and scrotum was similar to that already described in the first-passage guinea-pig. Rickettsiæ, similar in appearance to those seen in mouse peritoneal fluid, were seen in a small number of cells in tunica smears. Attempted culture of the spleen on blood agar produced no growth.

The results of these inoculations indicated that the strain could probably be maintained in guinea-pigs, but further passages were not made, as it was preferred to maintain the strain in mice by weekly passages.

Inoculation of Chick Embryos.

Yolk-sac inoculation of seven-day-old chick embryos was performed by Miss A. Brown, who used infective material of the fourth mouse passage. Incubation was carried out at 35° C. Penicillin and streptomycin were added to inocula as a routine in concentrations of 1500 units and 2·0 milligrammes per millilitre respectively. The mortality rate of the embryos was 100%. The survival time of the embryos was six days in the first passage, but gradually decreased with passage to four days in the fifth and following passages. Rickettsiæ were seen in a proportion of the Giemsa-stained yolk-sac smears.

Intraperitoneal inoculation of infected yolk-sac suspension into mice produced obvious hunching of the body and ruffling of the coat. At autopsy at seven days, peritoneal fluid and splenomegaly were regularly seen, and occasionally adhesions caused fixation of the slightly inflamed testes within the scrotum. Rickettsiæ could be demonstrated in peritoneal fluid smears, sometimes as early as four days after inoculation. However, second-passage mice showed only the mild symptoms seen in the usual mouse passages, so apparently no increase in virulence of the rickettsiæ for mice had occurred during the egg passages.

Serological Findings.

A serological study was made by Dr. J. I. Tonge and the staff of the Laboratory of Microbiology and Pathology, Brisbane. Convalescent serum from the patient J.C. and also from infected mice and guinea-pigs was tested for the presence of antibodies to other rickettsiæ present in Queensland. Because of the findings of Lackman and Parker (1948) that there was some degree of cross-reaction between *R. australis* and *R. akari*, the latter has also been included in this study. From these results (see Table II) it appears that the J.C. strain of rickettsia is not identical with *R. mooseri*, *R. tsutsugamushi* or *C. burneti*.

TABLE II.
Examination of Serum from the Patient and from Infected Mice and Guinea-pigs.

Serum.	Complement Fixation Reciprocal Titres.			Agglutination Reciprocal Titres.	
	R. akari.	*R. mooseri.*	*C. burneti.*	*Proteus* OX19.	*Proteus* OXK.
J.C. serum:					
8th day ..	–	–	–	–	–
21st day ..	–	–	–	256	–
Convalescent mouse serum pools:					
A	–	–	–	–	–
B	–	–	–	–	–
Convalescent guinea-pig serum:					
1172 ..	8	–	–	–	–
1174 ..	32	–	–	–	–

The differentiation between J.C. strain and *R. tsutsugamushi* was confirmed by the results of an immunity test. Twelve normal mice and 12 mice which had been inoculated with J.C. rickettsiæ forty-eight days earlier were inoculated with a virulent strain of *R. tsutsugamushi*. All the mice of both groups died between seven and eleven days after inoculation.

The OX19 agglutination of the patient's convalescent serum and the complement fixation of the guinea-pig serum with *R. akari* antigen are consistent with the known reactions of *R. australis*, and from the evidence it seems highly probable that the J.C. strain of rickettsia is identical with *R. australis*. Final identification will depend

on a detailed comparison with the original strain, which now survives only in the United States.

Discussion.

In this case mice were found to be more suitable than guinea-pigs for the primary isolation. Normal mice were used, whereas Andrew *et alii* used mice on a vitamin-deficient diet. It is interesting that J.C. strain can be maintained in mice apparently indefinitely, as Plotz *et alii* reported that mice were not susceptible to intraperitoneal inoculation of one of the original strains (PHS) of *R. australis* in infected guinea-pig tissue. The severe effects following inoculation of infective tissue-culture material into mice and their failure to be repeated in further passage, also noted by Plotz *et alii*, bear a resemblance to the effects of inoculation of infective yolk-sac material into mice reported here. The behaviour of J.C. strain in guinea-pigs and chick embryos was similar to that described for *R. australis* by earlier workers.

The presence of tick typhus in south-east Queensland, already recognized clinically, is confirmed by this rickettsial isolation. Mount Tamborine is approximately 900 miles south-east of the area in which the two original strains were isolated.

The history of the tick-bite prior to the onset of illness further supports the assumption of Andrew *et alii* (1946) that ticks are responsible for transmission of the disease. Investigating known endemic foci in North Queensland, Fenner (1946) demonstrated complement-fixing antibodies to North Queensland tick typhus rickettsia in eight of 111 specimens of animal serum; but guinea-pigs inoculated with ticks removed from the animals failed to become infected. The apparently greater suitability of mice for primary isolation of the rickettsia suggests that use might be made of mouse inoculation in any similar epidemiological investigations in the future.

Summary.

A rickettsia was isolated in mice from the blood of a patient who showed the clinical features of tick typhus.

Guinea-pigs failed to show an apparent infection after direct inoculation of the patient's blood, but proved susceptible when inoculated with infected mouse tissues and developed scrotal reactions.

The rickettsia was cultivated in the yolk-sac of chick embryos. When the strain became established, death of the embryos occurred four days after inoculation.

From the results of preliminary serological studies, the isolated rickettsia is provisionally accepted as a strain of *R. australis*.

Acknowledgements.

I wish to thank Miss Anne Brown for the yolk-sac inoculations, Dr. J. I. Tonge for the serological investigation, Mr. J. G. Carley for help with the animal inoculations, and Dr. E. H. Derrick for his helpful advice and constant interest in this work.

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Reports of Cases.

A CASE OF QUEENSLAND TICK TYPHUS.

By G. H. NEILSON, M.R.A.C.P.,
From the Medical Professorial Unit, Brisbane Hospital, Queensland.

IT is six years since any cases of Queensland tick typhus have been reported. A total of 16 cases have been described, and of these three only came from that part of the State south of the Tropic of Capricorn.

Clinical Record.

A schoolboy, aged sixteen years, was admitted to the Medical Professorial Unit of the Brisbane Hospital on September 20, 1954. On September 5, 1954, he had spent a day picnicking at Mount Tamborine, approximately 50 miles from Brisbane. On arriving home he noticed a tick in the left parietal region of his scalp. It was not until eight days later that he managed to extract the tick.

On September 16 he noticed soreness of the left side of the neck. The following afternoon he felt unwell and had a shivering attack. The soreness of his neck persisted. On September 18 he had a frontal headache of moderate severity, photophobia and some swelling around the left eye. At this time his temperature was 102° F. The next morning he felt better, but that afternoon there was a recurrence of the headache and photophobia, the temperature at this time being 101° F. He was admitted to hospital on September 20.

On examination, the youth did not look ill. His temperature was 101° F. There was an indolent pink papule, one centimetre in diameter, on the left parietal region of the scalp, surmounted by a small scab.

The lymph nodes on the left side of the neck were enlarged, discrete and slightly tender, the largest being about two centimetres in its long diameter. The lymph nodes on the right side of the neck and in the axillæ were enlarged to a less extent, but the inguinal lymph nodes were normal. Neither the liver nor the spleen was palpable. There were approximately 20 pinkish papules averaging 0·5 centimetre in diameter scattered over the trunk and limbs, and *acne vulgaris* was present on the face. A few of the papules were surmounted by a small clear fluid bleb a millimetre or two in diameter.

By September 22 the rash had become more profuse, the number of papules now being approximately 40, and mild conjunctivitis was present. An X-ray examination of the chest and a microscopic examination of the urine on this day gave normal results. A blood count revealed the hæmoglobin value to be 13·8 grammes *per centum* and the leucocytes numbered 4200 per cubic millimetre; 69% were neutrophile cells and 31% lymphocytes.

The next day the patient complained of a sore throat. Examination revealed diffuse faucial reddening with several spots of yellowish exudate, from two to five millimetres in diameter, over the fauces and posterior pharyngeal wall. A Weil-Felix agglutination test for the OXK and OX19 strains of Proteus on this day produced a negative result.

The temperature returned to normal on September 25, and the patient remained afebrile for the remainder of his stay in hospital. By September 27 the rash had faded and the patches of pharyngeal exudate were replaced by superficial ulcers averaging five millimetres in diameter with surrounding small areas of erythema, and these ulcers persisted for a further eight days.

On September 28 the leucocytes numbered 5000 per cubic millimetre, 39% being neutrophile cells, 40% lymphocytes, 12% monocytes, 6% eosinophile cells and 3% basophile cells.

The Weil-Felix test was repeated on October 6 and the OX19 strain of Proteus agglutinated to a titre of one in 256. The OXK strain was not agglutinated. Serological tests for *Coxiella burneti*, *Rickettsia mooseri* and *Rickettsia akari* also gave negative results. The strain *R. australis* was not at this time available in Australia for tests. By October 8 the lymph glands had returned to normal size.

The patient was given no specific therapy.

Blood and urine were collected on September 21, and from the former a rickettsia was isolated whose behaviour was similar to that of *R. australis* (the causative agent of Queensland tick typhus) though final identification has not yet been completed.

Discussion.

The features of Queensland tick typhus have been described by Andrew, Bonnin and Williams (1946), by Brody (1946), by Fenner (1946), by Funder and Jackson (1946), by Lackman and Parker (1948), by Plotz *et alii* (1946), and by Streeten, Cohen, Gutteridge, Wilmer, Brown, Smith and Derrick (1948).

The clinical picture in this case corresponded to that seen in previously reported cases. It is unfortunate that the infecting tick in this case was not brought to hospital for identification. The place at which the infection was acquired is a known focus of Queensland tick typhus (Streeten *et alii*, 1948). The incubation period in this case can be accurately estimated as eleven days.

The rash was first observed on the fifth day of the illness, but may have been present earlier than this. The presence of vesicular lesions mentioned by Andrew, Bonnin and Williams (1946) was noted. However, the great majority of the lesions were pinkish papules, relatively few in number, but with a generalized distribution. These lesions persisted for eight days.

Conjunctivitis (in this case appearing on the seventh day of the illness) has been observed by Andrew, Bonnin and Williams (1946); but ulcerative pharyngitis such as appeared in this patient on the eighth day and lasted for thirteen days has not been noted previously in this disease. Whether the pharyngitis was a manifestation of the rickettsial infection or an unrelated intercurrent infection was not clear. No organisms could be grown from swabbings of these pharyngeal ulcers.

There was a local papule at the site of the tick bite, but no eschar was present. The lymph glands regional to this area were the most dramatically enlarged, but more widespread lymphadenopathy was also present.

The known total duration of the febrile period was seven days. At no time did the patient appear severely ill. This is in considerable contrast with the other forms of rickettsial disease seen in Queensland (scrub typhus, "Q" fever and murine typhus).

The rise in titre of the agglutination of the Proteus OX19 strain from zero on the eighth day of the illness to one in 256 on the twenty-first day after onset, is compatible with the diagnosis of Queensland tick typhus.

It seems probable to the writer that the disease is more common than the number of reported cases would suggest, and that the failure to recognize the condition is probably due to the mildness and self-limited nature of the disease.

Summary.

A case of Queensland tick typhus is reported and discussed in relation to previous literature.

Acknowledgements.

The writer would like to express his thanks to Professor J. H. Tyrer, under whose care the patient was admitted to the Unit, for his advice and encouragement; to Dr. E. H. Derrick, of the Queensland Institute of Medical Research, for the rickettsial studies; to Dr. J. I. Tonge, of the Laboratory of Microbiology and Pathology, for performing the serological tests; and to Dr. A. D. D. Pye for permission to use records of the Brisbane Hospital.

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A CASE OF "TOXIC MYOCARDITIS" DUE TO THE COMMON COLD WITH AN UNUSUAL TYPE OF ELECTROCARDIOGRAM.

By TERENCE C. BUTLER,
Hobart.

TOXIC MYOCARDITIS has been described associated with many diseases. In 1947 Gore and Saphir reported 35 cases of myocarditis due to nasopharyngitis and tonsillitis; 12 would seem to have followed a common cold.

During the winter of 1954 Hobart suffered from two epidemics affecting the upper respiratory system—influenza, caused by the virus A, and a cold of rather a peculiar variety. It usually started as pharyngitis and then infected the nose and bronchi. The cough was extremely difficult to get rid of.

It was this type of cold, and not influenza, from which the patient whose history is described below suffered.

Clinical Record.

A female patient, unmarried, aged thirty-six years, had always been healthy. She contracted a severe cold starting with a sore throat on about July 1. This was succeeded by a severe cough without much sputum. There were no signs of diphtheria, nor has there been any case of this disease in this town for some years. She was not confined to bed, and on July 7 she fainted and was unconscious for about fifteen minutes. Later in the day she walked to the Casualty Department of the Royal Hobart Hospital, where Dr. D. Gibson found her to have a pulse rate of about 45 per minute.

An electrocardiogram revealed a sino-auricular block with an auriculo-ventricular nodal rhythm, the rate being 43 per minute. There were many ventricular extrasystoles, mostly as coupled beats with a fixed interval, and mostly from a single focus. The *QRS* complex showed some evidence of aberrant conduction. At this time she felt well, except for the bradycardia her heart sounds were normal, her blood pressure was 155 millimetres of mercury, systolic, and 80 millimetres, diastolic, and her temperature was 97° F. There were a few moist sounds at the bases of the lungs.

She was diagnosed as suffering from toxic myocarditis and admitted to hospital as an in-patient. The next morning, July 8, her temperature was slightly raised (99·6° F.), but subsequently it was normal. The white cell count was 9100 per cubic millimetre. She said that she felt quite well. The electrocardiogram (Figure I) showed sino-auricular block, nodal rhythm with long pauses between many nodal beats, and in the intervals runs of ventricular beats, to be discussed below.

It was recognized that she had two main dangers, ventricular fibrillation and complete asystole. In view of

the danger of the latter it was decided to withhold "Pronestyl" and quinidine for fear of further depressing the auriculo-ventricular node on which she was depending, and she was given penicillin in the hope of keeping down a secondary infection.

Her condition was unchanged on July 9, and a further electrocardiogram was taken (Figure II). Whilst the tracing was being taken the patient remarked that she felt quite well and wished to go home. She suddenly died five minutes later, probably from ventricular fibrillation or cardiac standstill.

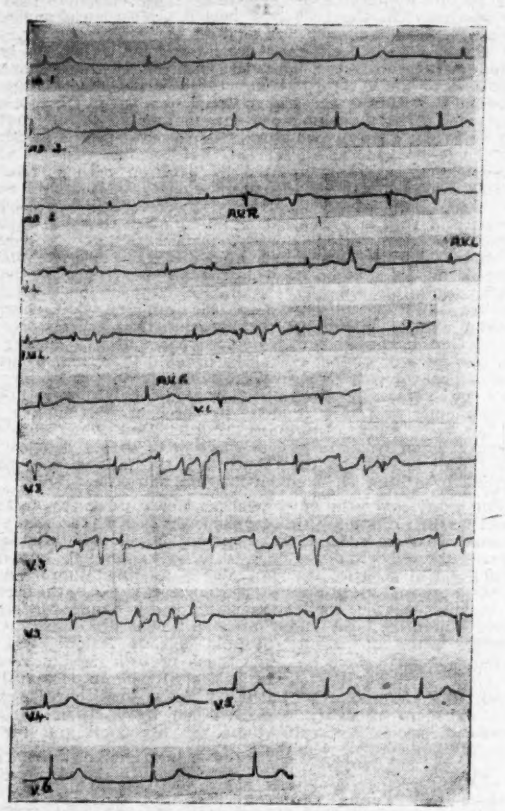

FIGURE I.

Electrocardiogram taken on July 8, 1954, reduced to about half-size, showing sino-auricular block, auriculo-ventricular nodal rhythm and runs of ventricular extrasystoles of various types.

Autopsy.

At the autopsy, patchy congestion was found in both lungs, and there was pronounced jelly-like œdema of the visceral pleura. There was no increase in pleural fluid.

Macroscopic examination of the heart showed it to be normal in every way. There was no suggestion of colour change or of change in consistency of texture. The arteries were normal.

The liver was normal in size and shape, but not of healthy appearance. It was very soft and friable and of a dull yellow colour.

Sections were taken from the right auricle near the site of the sino-auricular node, from the anterior wall of the right ventricle and from the anterior wall of the left ventricle. The general architecture of the myocardium was normal, but there were small areas of cellular infiltration throughout. The cells were mostly lymphocytes, and there were a few larger round cells of the macrophage type. Occasional polymorphonuclear cells were present, but in insignificant numbers. There was no necrosis. The lesions were not extensive in any region, but were widespread, being disseminated throughout all three blocks. They did not resemble Aschoff nodules. The appearances were those of diffuse myocarditis and were consistent with a virus myocarditis. Examination of sections of the liver revealed toxic damage with considerable cloudy swelling and some fatty infiltration of the cells. The appearances were toxæmic—there was no evidence of hepatitis.

The most pronounced round-celled infiltration in the heart was in the region of the sino-auricular node.

The Electrocardiogram on July 9.

The major portion of the tracing in all leads shows sino-auricular block with auriculo-ventricular nodal rhythm similar to lead I (Figure II). (The same condition is present in other previous tracings.) There are very long pauses between the nodal escapes (3·2 seconds

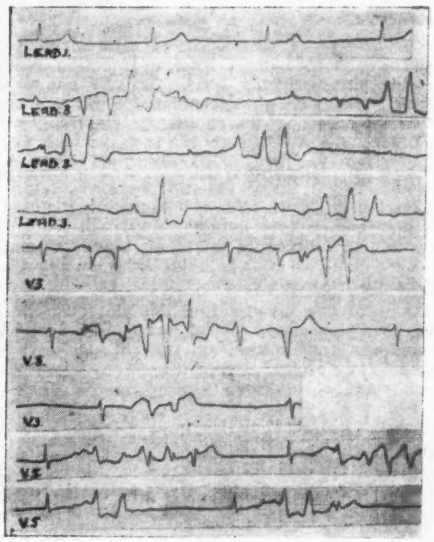

FIGURE II.

July 9, 1954: Tracings taken five minutes before sudden death. The major portion of the tracing of which this is part shows a regular nodal rhythm with many ventricular extrasystoles. Further discussion in the text. (Reduced to half-size.)

in lead II and 3·0 seconds in lead V_5). In between these, at a fixed interval from the *QRS* complex, is the first ventricular extrasystole, not always of the same type. This is followed often by one or up to four ectopic beats at the rate of about 200 per minute, and all of different character. If these "runs" were caused by a single focus, then the path of depolarization would have to be different for every beat. A more likely explanation is that supplied by the theory of re-entry. Bellet (1953) explains the theory to mean that there may be one or more areas of depressed irritability in the myocardium which are unaffected by the excitation process. By the time this process reaches the terminal portion of the ventricle, the depressed area has recovered from the refractory state and responds, thus exciting the normal myocardium and causing an extrasystole.

In this case it would seem that there were many such areas, and when one was excited this in turn fired off another and so on until all were exhausted. The run of extrasystoles then ceased, and after a considerable pause the nodal escape was resumed.

Schwartz and Hallinger (1953) show tracings of "initial fibrillary periods", which are remarkably similar to those

in this case. It would seem that this is the most likely explanation of the curious rhythm. If so, it is remarkable that except for the initial syncopal attack and the final fatal seizure, the patient had practically no discomfort.

Discussion.

Several problems present themselves in this case.

1. What was the immediate cause of death? It would seem that this was either ventricular fibrillation or cardiac standstill, and unfortunately it was just missed in the tracing.

2. Could the patient have been saved by quinidine or "Pronestyl"? Or would either of these have depressed the auriculo-ventricular node upon which she was depending, and thus have caused death by asystole, or have actually increased the probability of ventricular fibrillation?

With regard to the prognosis in these cases, Paul Wood states that about 50% of these patients die, and Gore and Saphir report that of their 35 patients, 15 died unexpectedly.

3. The process which caused the peculiar form of tracing seems to have been caused by the infection completely blocking the sino-auricular node. This is not surprising when it is noted that the greatest amount of round-cell infiltration occurred at this point. It is likely that the diffuse inflammation throughout the rest of the myocardium caused various small areas of delayed excitability, thus producing ectopic beats.

The question as to whether the condition is an infective or toxic myocarditis is debatable. It would seem unlikely that a common cold could cause so much toxæmia; but on the other hand there was some liver damage, presumably toxic in character.

If sections of the myocardium had not been taken, the infective condition could never have been demonstrated. This reaffirms the statement that it is advisable to examine sections of the myocardium even when the heart appears normal.

Acknowledgements.

My thanks are due to Dr. G. A. Robbie, who had charge of the patient, for permission to report this case, and also to Dr. D. E. Anderson and Dr. Campbell Duncan for pathological reports, and to Miss E. D. Todd and Miss K. E. Harvey for the tracings.

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Reviews.

The Surgery of Pulmonary Tuberculosis. By James H. Forsee, A.B., B.S., M.D., F.A.C.S., F.A.C.P.; 1954. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 9½" × 6½", pp. 208, with 59 illustrations, one in colour. Price: 70s.

THIS book gives a concise and interesting account of the personal experiences of the author and his colleagues at the Fitzsimons Army Hospital in Colorado, United States of America. It is a monograph, not a text-book. The author deals first with the principles of the application of surgery in pulmonary tuberculosis; then he discusses the various operations with special reference to those that have proved most satisfactory, and finally he reviews experiences at the Fitzsimons Hospital. A selection of his ideas is here presented to show the quality of this book; some of these are still controversial, but Forsee's outlook is judicial and balanced. He states that surgery in suitable cases not only improves the prognosis but also lessens the period of convalescence. Like most workers in this field, he is uncertain whether small residual foci persisting after six to eighteen months' chemotherapy should be eradicated. He rightly emphasizes that apparently stabilized disease may break down and become active whether or not chemotherapy has been used. This is a point in favour of extirpation. He also reminds us that there is more disease than the skiagrams indicate. In regard to collapse therapy he states that thoracoplasty is the most successful operation and most experienced thoracic surgeons agree with this opinion; but it is disappointing to learn that only 10% of patients so treated regained their full working capacity. This low figure may be due in part to the omission of apicolysis as part of the operation in the 1940-1946 period. Most surgeons consider apicolysis an essential part of the thoracoplasty, and the author does not explain why he and his colleagues have abandoned it. Forsee still advises removal of the transverse processes of the vertebræ; many thoracic surgeons no longer consider that this is necessary. He does a seven rib thoracoplasty in three stages; most surgeons have found that it can be safely done in two stages for the majority of patients. There will be general agreement that residual cavities after thoracoplasty are best treated by excision rather than by drainage or revision of the thoracoplasty. More and more of his patients are being treated by resection of diseased tissue, and this is a general trend in most thoracic centres throughout the world. Forsee's discussion on "Extirpative Surgical Therapy" is sound and clear. He recommends surgery as soon as he is certain that there is a persistent cavity, pointing out that the main dangers of cavitation are spread of the disease and bleeding, and that there is greater risk of spread before operation than after. He has found that if the sputum becomes "negative" within a year the patient will almost certainly be able to return to work. Total thoracoplasty (removal of ribs one to ten or eleven) may be necessary for a tuberculous empyema; Forsee recommends that this be done in three or four stages, but it has been shown by many thoracic surgeons that this operation can be done in one stage with safety because the chest wall is so rigid that there is little danger from paradoxical breathing or from mediastinal flapping.

For giant cavity he advises chemotherapy for two to three months, then a five rib thoracoplasty in two stages, and then, one to three months later, excision of the cavitated area, usually by lobectomy. This is a useful sequel, but most patients will tolerate excision *plus* a modified thoracoplasty in one stage. Before extirpative surgery is done, the patient is usually treated with chemotherapeutic drugs for six to twelve months, and these are continued for four to six months after operation; for old fibrous lesions and for circumscribed lesions he finds these periods need not be so long. The results of surgery at the Fitzsimons Hospital are good; for example, the mortality from lobectomy is 1·5% and excellent recovery was attained by 90% of patients. Forsee deserves congratulations for his book and for his and his colleagues' results.

Babies and Young Children: Feeding, Management and Care. By Ronald S. Illingworth, M.D. (Leeds), F.R.C.P., D.P.H., D.C.H., F.R.P.S., and Cynthia M. Illingworth, M.B., B.S. (Hons.) (Durham), M.R.C.P. (London); 1954. London: J. and A. Churchill, Limited. 8½" × 6", pp. 368, with 74 illustrations. Price: 18s.

THIS book is written primarily to help parents in the management of their children, but every pædiatrician and general practitioner will profit by reading it. It covers all aspects of child care from food and clothing to discipline, play and the common ailments. This is not a book written "from the outside looking in"; it is a book written by people who work with children, live with children and love them, who know them sick and well, normal and abnormal. Their keen appreciation of the child's viewpoint and the parent's difficulties has enabled them to produce a book that should be welcomed by every doctor with interests of parents and children at heart.

The Illingworths advocate the Gesell approach to child care, that is, guidance according to the child's stage of development with appreciation of the variations in normal behaviour that occur as the result of age, constitution, temperament and environment. This method is not easy for parents to grasp; they too often rush to the book that lays down rigid rules or no rules because they are confused by more permissive teaching; but the Illingworths succeed to an amazing degree in being sufficiently authoritarian and practical for most parents while still discussing problems in such simple everyday language that the parents find themselves understanding the situation and not just applying a

rule of thumb. This easy, at times humourous, style of writing is comforting and relaxing to the parent who then takes more kindly to the occasional list of rules and dogmatic statements in italics, for example, "Frequent punishment is always a sign of failure in parents", "It is always wrong to force any baby or child to sit on a pottie against his will". The photographs are delightful and drawings are skilfully used to illustrate particular situations and their problems. If these drawings were just a little better one could say that here was a book that in every way could equal, if not surpass, well-known old favourites. However, though it is also more expensive than the latter, it is hoped that doctors, libraries and those parents who are prepared to spend money on their children will buy it.

The Essentials of Materia Medica, Pharmacology and Therapeutics. By R. H. Micks, M.D. (Dublin), F.R.C.P.I.; Sixth Edition; 1954. London: J. and A. Churchill, Limited. 8" x 5½", pp. 444. Price: 24s.

THE sixth edition of this well-known text-book emphasizes by its revision the changing state of drug therapy today. Perhaps over the last four years these changes individually have not been of very great magnitude, but collectively they are quite sufficient to make the busy physician feel a little bewildered. It is here that Micks plays a very useful part, for, in a book of very reasonable size, he has endeavoured to give a concise account of the materials of therapeutics.

The new edition has been extensively rewritten and the autonomic drugs and muscular relaxants have been placed in close apposition to the anæsthetic drugs in accordance with their current use. A new chapter has been included on the adrenal cortical steroids and ACTH; and the section on antibiotics has been expanded and improved, particularly by the addition of a chapter devoted to considerations governing the rational use of these drugs.

The subject of pharmacology and drug therapy is such a big one that it is difficult to give a useful account of the subject in reasonable compass, but it is a little disappointing to find no mention of the newer drugs used in hypertension such as the Rauwolfia alkaloids or the hydrogenated ergot alkaloids, and in fact this interesting subject is dismissed in a very brief manner. The new synthetic antispasmodic drugs such as methantheline, although they have been in use for some time for the treatment of peptic ulcer, also receive no mention, and yet one would have thought that a chapter could well have been devoted to this subject.

For the student of pharmacology, Micks's book is undoubtedly insufficient in detail and the enthusiastic clinician will naturally need to refer to more extensive works; but as a concise reference source of established drugs and their uses, this book should prove valuable to those in general practice.

Leg Ulcers: Their Causes and Treatment. By S. T. Anning, T.D., M.A., M.D. (Cantab.), M.R.C.P.; 1954. London: J. and A. Churchill, Limited. 9" x 6", pp. 186, with 42 illustrations. Price: 18s.

FOR too long have all breaks in the skin below the knee been dubbed varicose ulcers. This book by its very name emphasizes the inadequacy of such a classification. The point is further stressed in the introduction where mention is made of all the unusual and rare ulcers that can occur on the leg.

The main part of the book is an extensive review of the literature on the subject, combined with the results of personal experience in a leg ulcer clinic (not a varicose ulcer clinic) over a period of eight years. All the common types of ulcers are discussed fully and there are interesting chapters on thrombosis and its causes, miscellaneous factors such as obesity, arthritis and arterial disease, and the influence of heredity. The emphasis throughout is on deep vein thrombosis as the outstanding cause of ulceration of the leg. Too little importance is given, unfortunately, to the role of varicose veins themselves in the production of ulceration. The treatment for ulcers is confined to tried and successful non-operative methods, with brief mention of others tried and *sub judice*. There are excellent illustrations showing the techniques used, elastic support and Bisgaard's methods being those most favoured.

The surgical review is admittedly undertaken with some diffidence, the author being a physician and dermatologist. It is the least convincing part of the book. Saphenous section receives scant consideration, and it is remarkable in a review of 800 cases of deep vein thrombosis to find that no fewer than 42 were due to injection treatment of varicose veins. Moreover, such injection treatment is considered to have no place in the treatment of varicose veins.

The book gives an excellent account of the difficult problem of leg ulcers and is full of practical and sound advice. It is, moreover, easy to read and the historical references are interesting and show in some cases how little progress we have made. However, the conviction remains that these ulcers should be under the care of a surgeon and not a dermatologist. At the same time all will agree that large-scale teamwork is essential in the study of this problem.

Guide to the Classification and Identification of the Actinomycetes and Their Antibiotics. By Selman A. Waksman and Hubert A. Lechevalier; 1953. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" x 6", pp. 254. Price: 53s. 9d.

THIS book is a comprehensive and descriptive catalogue of the saprophytic species belonging to the genera Streptomyces and Nocardia together with a systematic classification of the antibacterial substances produced by members of these genera. The book is intended as a guide for those engaged in antibiotic research and will undoubtedly be useful to those bacteriologists who are interested in the systematics of these organisms. It will, however, have little appeal for the medical profession. In fact it was not written for such an audience since the emphasis in the antibiotic section lies more in the chemical, physical and biological properties of the substances rather than their use in clinical medicine.

The Parents' Book: A Guide to Mothercraft. By Margaret H. Harper, M.B., Ch.M., F.R.A.C.P., and Kathleen Winning, M.B., Ch.M. (Sydney), D.C.H. (London); Twentieth Edition; 1955. Sydney: Angus and Robertson, Limited. 7½" x 5", pp. 110, with 12 illustrations. Price: 9s. 6d.

MANY graduates of thirty years ago had this book by Dr. Margaret Harper on entering country general practice. It was most helpful to a recent graduate with little knowledge of "mothercraft" and the everyday care of healthy infants. The new edition, by Dr. Margaret Harper and Dr. Kathleen Winning, is an excellent handbook for parents and again would be very useful to the "beginner" in general medical practice. Pre-natal and post-natal exercises for the mother are well illustrated. Good advice to the expectant mother includes a sensible list of the clothing necessary for the baby, choice of cot and how to make it, and how to bath a baby. The feeding of babies and young children is admirably covered by authors who speak with the authority of long experience and there are brief notes on common ailments. There is a valuable chapter on the care of the premature infant. This is a book to recommend to every young mother.

The Health of the Community: Principles of Public Health for Practitioners and Students. By C. Fraser Brockington, M.A., M.D., D.P.H., B.Chir. (Cantab.), M.R.C.S. (England), L.R.C.P (London), of the Middle Temple, Barrister at Law, with a foreword by John Stopford, M.D., Sc.D., LL.D., F.R.C.P., F.R.S.; 1954. London: J. and A. Churchill, Limited. 8½" x 6", pp. 428. Price: 32s.

ANY publication from the pen of Professor G. Fraser Brockington commands the attention of every person interested in public health.

"The Health of the Community" is a misleading title in that readers, particularly those who enjoy Professor Brockington's "Letters from Great Britain" in the *Canadian Journal of Public Health*, expect a philosophical approach on the broadest lines to social medicine, only to find that the subtitle "Principles of Public Health for Practitioners and Students" is a far more accurate description of the contents.

The book is filled with facts and figures which are invaluable to students; indeed the entire book gives the impression of being a publication of Professor Brockington's notes from which he has lectured to students. One deeply envies those who have the opportunity to attend the lectures which these notes summarize, and to have the subjects elaborated and explained in Professor Brockington's inimitable style.

An impossible task has been attempted in this four-hundred-page manual to present the history, epidemiology, environment and social aspect of community health. The information is all there, but is far too condensed to appeal

to, or have impact on, those practising and teaching clinical medicine.

The book concerns the people of Great Britain and the structure of public health medical and social services in the United Kingdom. Nevertheless the public health structure in most Australian States has so closely followed the British pattern that most of the material is relevant here. Even parts which do not apply, such as the *National Health Service Act*, are valuable as a critical survey of the strengths and weaknesses of the system.

Public health workers and teachers will applaud the author's attempt to give "Public Health" its full connotation, as neither preventive nor social medicine can satisfactorily replace this all-embracing discipline.

"The Health of the Community" is a valuable addition to public health literature, but one doubts whether it will "promote the new era in which the family doctor and the medical officer of health . . . will collaborate more closely and effectively" for which Sir John Stopford, in his foreword, hopes.

Lyle and Jackson's Practical Orthoptics in the Treatment of Squint (And Other Anomalies of Binocular Vision). Revised by T. Keith Lyle, C.B.E., M.A., M.D., M.Chir. (Cantab.), M.R.C.P. (London), F.R.C.S. (England), assisted by Marianne Walker, D.B.O.(T.); Fourth Edition; 1953. London: H. K. Lewis and Company, Limited. 10" x 7¼", pp. 384, with three coloured plates and 192 illustrations. Price: 63s.

THIS book has for many years been the standard, in fact almost the only, text-book for orthoptic students and ophthalmologists interested in the more practical aspect of orthoptics. This enlarged fourth edition has further enhanced its reputation. As well as additional chapters on ocular neurosis and nystagmus, the remaining chapters have been carefully edited, rearranged and enlarged, so that subjects previously neglected, such as alternating hyperphoria, are now covered.

T. Keith Lyle acknowledges the assistance of Mrs. Marianne Walker, an orthoptist who has had both practical and teaching experience in England and the United States of America.

The section covering orthoptic instruments and their use is now more detailed, although the optics used to explain the principles of the stereoscope is somewhat too advanced for orthoptic students. In fact the main criticism of this book is that while being a more complete coverage of the subject, it is no longer an easy book for beginners. It is pleasing to note that full explanations have been given for students on the actual methods of using the equipment and performing such tasks as measuring the angle of squint by methods other than the major amblyoscope.

The section on acquired and congenital paralytic strabismus is still one of the best in the book. The larger introductory chapter outlining the scope of orthoptics, the types of squint and notes on binocular vision is very useful. Divergent squint still gets rather scant coverage, although this chapter is a great improvement on previous editions.

This is not a book for students interested in the ætiology and theories of strabismus—Keith Lyle has covered this elsewhere—but for the practical application of orthoptic methods it is invaluable.

Standard Values in Nutrition and Metabolism: Being the Second Fascicle of a Handbook of Biological Data. Edited by Erret C. Albritton, A.B., M.D.; 1954. Prepared under the direction of the Committee on the Handbook of Biological Data, American Institute of Biological Sciences, The National Research Council. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 11" x 9", pp. 394. Price: £3 1s. 9d.

FIVE years ago the National Academy of Sciences—National Research Council—contracted with the Wright Air Development Centre, United States Air Force, to gather and compile for publication the more basic established data in the various fields of biological science. The first volume published in 1952 was "Standard Values in Blood". The second volume, just published, is "Standard Values in Nutrition and Metabolism". This volume is the product of contributions of more than 800 specialists, in the fields of nutrition and metabolism, in the United States of America and abroad. The relevant data have been collected from every possible source, carefully considered by the specialists who rejected all questionable or controversial data, leaving for final presentation only what is at present accepted as fact by those competent to judge.

There are 223 pages of tables and 16 pages of diagrams. There is an immense amount of information in the tables. Almost every aspect of nutrition and metabolism that could be considered quantitatively is included. The food requirements in terms of proteins, amino acids, fats and fatty acids, carbohydrates, vitamins and mineral salts of living things from bacteria, yeasts and fungi through many higher plants and many animal forms to man are given in so far as these are known. Of course, there are very many gaps and the accepted figures are given with wide ranges. The signs of deficiency and excess of vitamins and mineral salts are given in some detail in tabular form. These seem rather out of place in such a volume. Various aspects of metabolism are also considered in 66 tables. The diagrams, such as "Pathways of Carbohydrate Metabolism", the "Cytochrome System", "Chlorophyll Synthesis", to select a few, are excellent, but they represent present-day opinions of some, probably the majority of biochemists, and are not quantitative. There are over 100 pages of references in small print—many thousands of them. It must have been a prodigious task to collect all that data together and cull it. The result is a volume which must be useful in any research laboratory in biochemistry, physiology, botany and zoology, if only as a source book.

Notes on Infant Feeding. By Stanley Graham, M.D., F.R.C.P. (Ed.), F.R.F.P.S. (Glas.), and Robert A. Shanks, M.D., M.R.C.P. (Lond.), F.R.F.P.S. (Glas.); Fourth Edition; 1954. Edinburgh and London: E. and S. Livingstone, Limited. 7¼" x 5", pp. 74. Price: 4s. 6d.

THIS book is intended for medical students, but many general practitioners will find it a useful and up-to-date guide. There are sections on breast feeding, artificial feeding and introduction of mixed feeding, feeding the premature baby, failure to thrive and vomiting and diarrhœa. There is also a useful appendix to refresh one's memory on the height, weight, ossification centres, teeth *et cetera* at each age. The writers maintain that "feeding should not be left to the nurse" and that all physicians caring for children should not only be able to "give precise feeding instructions", but also have some understanding of the "ambiguous language" of infancy. Unfortunately there is no mention whatever of emotional problems of babies, and one gets the impression that failure to thrive is entirely a physical condition. However, if one accepts this book purely as a simple guide to infant feeding, as it is intended to be, it is good.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"A Therapeutic Index: A Guide for Housemen and Practitioners", by C. M. Miller, M.D. (London), M.R.C.P. (London), and B. K. Ellenbogen, M.D. (Liverpool), M.R.C.P. (London), with a foreword by E. Noble Chamberlain, M.D., M.Sc., F.R.C.P.; 1955. London: Baillière, Tindall and Cox. 7¼" x 5", pp. 160. Price: 12s. 6d.

An attempt to provide "a ready guide to the treatment of many of the common and some of the less common conditions met with in medical practice".

"The Lipids: Their Chemistry and Biochemistry", by Harry J. Deuel, junior; 1955. New York: Interscience Publishers, Incorporated. London: Interscience Publishers, Limited. In three volumes. Volume 2: "Biochemistry: Digestion, Absorption, Transport and Storage." 9½" x 6¼", pp. 936, with 33 text figures. Price: $25.00.

The volume "encompasses the available information on the digestion, absorption, transport (in the blood and lymph) and storage of fats and other lipids in the animal body".

"Aids to Psychiatry", by W. S. Dawson, M.A., D.M., F.R.C.P. (London), F.R.A.C.P., D.P.M.; Seventh Edition; 1955. London: Baillière, Tindall and Cox. 6¼" x 4", pp. 322. Price: 8s. 6d.

One of the well-known "Students' Aids Series" founded in 1876.

The Medical Journal of Australia

SATURDAY, MAY 21, 1955.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

LEPROSY AND ITS ERADICATION FROM THE BRITISH COMMONWEALTH.

ALTHOUGH extensive reference has been made in this journal during the last five years to leprosy, or, as many would prefer to call it, Hansen's disease, reference must be made to it again. For this there are two reasons. The first is that a discussion on the subject was held in May last year at the meeting of the Royal Society of Arts. The second is that a paper was presented by Sir Leonard Rogers, who is known the world over for his contributions to the subject of the eradication of this disease. Sir Leonard Rogers, who is now in his eighty-eighth year, contributed an article to this journal in the issue of October 18, 1930, at page 525. The title of his paper was: "When will Australia Adopt Modern Prophylactic Measures against Leprosy?" In the course of this article the author drew attention to the failure of rigid compulsory segregation to stamp out leprosy, and he discussed the reasons for this failure. He referred to the clinical curability of early leprosy and its bearing on modern prophylaxis, and also to the proportion of early to advanced cases of the disease found in surveys. He pointed out that the mediæval view of leprosy as a highly contagious disease was untrue. He held that the modern prophylaxis of the disease consisted in the curative treatment of patients who were in the early stages and whose infection was detected by frequent examinations of contacts. He maintained that if this method was used, compulsory segregation would become obsolete in about two decades. He referred to the value of the plan as shown in the case of Nauru Island and other places. He also discussed the modification of rigid compulsory segregation to allow of early diagnosis and treatment. We would remind readers that the history of leprosy in Nauru is a fascinating story; it was told in a leading article in this journal in the issue of November 22, 1952, at page 749. Readers should also be reminded that a discussion on the epidemiology and control of leprosy took place at the eighth session of the Australasian Medical Congress (British Medical Association) held at Melbourne in 1952. An account of this discussion will be found in the issue of October 18, 1952, at page 567. C. E. Cook, of the Commonwealth Department of Health, read a paper in which he claimed that segregation had been successful in reducing the prevalence of leprosy in Australia. He said that but for the measures of control applied with more or less efficiency since 1890 leprosy would have been much more prevalent, and he thought that to abandon the measures would not be without danger. A. Fryberg, of Queensland, supported Cook's view. He said that only a handful of patients suffered from Hansen's disease, and that if they were kept in isolation until they gave negative results from smear examination, the incidence of the disease would be greatly reduced.

The chairman of the meeting of the Royal Society of Arts was Sir Selwyn Selwyn-Clarke, who while he was introducing Sir Leonard Rogers named several members of the British Commonwealth of Nations which had in recent years attained their independence—namely, India, Pakistan, Ceylon and Burma. He added, however, that there were still some seventy millions of people in the colonies of Great Britain and that amongst them there were, he believed, something like 750,000 lepers. Sir Leonard Rogers referred to a paper which he had read before the Society in 1946, and mentioned conditions under which leprosy was contracted. He said that allowing for the incubation period, from 50% to 75% of infections were contracted in childhood or adolescence. The incubation period had reached three and a half years; in some 80% of cases it did not exceed five years. Among 113 cases in which the source of infection had been traced, 95% had been traced to close house contact with a sufferer from a muco-cutaneous (lepromatous) form of the disease with myriads of lepra bacilli being discharged from the nasal mucous membrane. Only the remaining 5% had been contracted from patients with neural infections, with very few bacilli in the tissues, from which they could not easily escape. Among 700 cases in which the source of infection had been traced, almost 60% of sufferers had lived for a long time in a house that had previously been occupied by a sufferer, and nearly all the rest had been in close contact with one. In a few cases infection had occurred as a result of inoculation from another patient. Included in these were three surgeons who developed the first symptoms of the disease in a finger which had been injured while they were operating on a patient suffering from the disease. It was thus clear that early infections had to be sought mostly in a house that had been occupied by a previous sufferer from the disease, or among persons who had otherwise been in close contact with a sufferer. The plan for the control and reduction of the incidence of leprosy formulated by Sir Leonard Rogers was as follows. In the first place, only the infective lepromatous sufferers, who constituted one-fifth to one-fourth of the total number as a rule, required to be isolated; this should be done on a voluntary basis as far as possible with emphasis on the benefits following on modern treatment. This would bring

about a corresponding decrease in cost as compared with that of the old compulsory segregation of all types. Surveys of the whole population in badly infected areas, or in all houses in which sufferers and their close contacts were found, were required to find and isolate the sources of infection. In the second place, since many children in the incubation period would be left in the houses, all such contacts should be examined by a leprologist every year or two for a decade to allow of the detection of newly developing infections in the very curable stage and their economical treatment at special clinics and hospitals. The need for the examination of children was illustrated by the fact that forty very early cases were found at a third survey of a tribe of 7000 people in Nigeria, although not a single infection had been found at the second survey. Sir Leonard Rogers then referred to efforts at control that had been made in many parts of the world. He said that BELRA (the British Empire Leprosy Relief Association), on its foundation, had accepted the plan for the control of leprosy which he had described. Successive secretaries of the Association had toured the colonies to give advice on leprosy control work and to find the most suitable area for a large-scale trial of the control plan. Macdonald had organized the largest leprosy settlement in the British Empire at Itu in Nigeria. In this settlement there were 4000 patients, and the recent figures were that up to 800 were being discharged cured each year. At a settlement at Oji River by 1944 over 14,000 patients were being treated at numerous clinics by hydnocarpate. In the West Indies, on the other hand, results had been disappointing because repeated visits of BELRA secretaries had failed to secure the adoption of the plan of control. When Muir, one of the secretaries, had made a second visit to Jamaica in 1944, he found that his advice on an earlier visit had not been carried out—he discovered 17 known infective lepromatous patients living in close contact with 47 children at a most susceptible age. Sir Leonard Rogers estimated that one million dollars must have been expended uselessly on compulsory isolation in Jamaica during the past thirty years. He said that the question was whether Jamaica could afford not to carry out the available leprosy control measures. The average stay in their asylum was recorded to have been nine to thirteen years, and one unfortunate patient had been segregated for fifty years at a probable cost of £2500. This patient had almost certainly been suffering from an uninfective nerve form of the disease and his isolation contributed nothing to the reduction of new infections.

In the matter of treatment, Sir Leonard Rogers referred to the discovery of the sulphone treatment of the disease. The sulphones had been found extremely costly for extensive use. The drawback had, however, been overcome by Cochrane's injections of sulphetrone and by the finding of Lowe that DDS given orally was quite effective in much smaller and less toxic doses. By each of these drugs patients could be treated for a year at less than one pound per head, and this had been done in the successful large scale use in Nigeria which has already been mentioned. Ericksen had recorded in 1950 that at Carville, the world's best staffed and financed leprosarium, several years of sulphone treatment might fail to destroy all the lepra bacilli in cutaneous lesions, with the result that one-third of the patients with lepromatous leprosy suffered a relapse when the use of the drug was discontinued; he had often advised that small doses should be continued for several years after clinical recovery, and Muir had recorded a similar warning. It was for this reason that Sir Leonard Rogers had suggested in 1948 the combined use of sulphones and sodium hydnocarpate. Muir had found this effective by giving sulphones orally and at the same time injecting hydnocarpates into the cutaneous lesions. When he injected the cutaneous lesions on one side, there was greater destruction of lepra bacilli in the lesions on that side than in those on the other. Discussing the "prophylaxis of child contacts", Sir Leonard Rogers said that after removal of all infective patients from the houses of the people, there would usually remain behind children already infected but in the incubation stage, whose first symptoms would not appear before three more years. Promising prophylactic measures were under trial with a view to immunizing these children against the disease. First of all, treatment during the incubation period consisted in the prolonged administration of the curative drugs now available; conclusive results could not yet be claimed. In the second place, B.C.G. prophylaxis could be used. In 1926, in a paper on resemblances between leprosy and tuberculosis, Sir Leonard Rogers had pointed out that very high leprosy incidence in West Africa was accompanied by a very low percentage of positive tuberculin reactions, in contrast to the reverse conditions in western Europe. Moreover, data from European and other countries had been brought forward to support the theory that a progressive driving-out of leprosy by tuberculosis was attributable to relative cross-immunity between the two affections. B.C.G. vaccine clearly had a protective effect in regard to leprosy infection. This was shown by the occurrence of the infection in only 0·6% of 1638 vaccinated children against 5·6% of 3329 who were unvaccinated—a ninefold reduction. Moreover, among 179 infections among the unvaccinated, 47 or 26·8% were of the infective lepromatous type; among the few cases occurring among the vaccinated persons, "only tuberculoid leprosy developed". If results such as these can be confirmed, clearly a great advance will have been made in the prophylaxis of the disease.

The relationship between leprosy and tuberculosis should be further mentioned. In the discussion following the reading of Sir Leonard Rogers's paper, E. Muir referred to the disappearance of leprosy from England. He said that although there were numbers of patients, people who had been infected abroad and had come back to Britain, many of them mixing with the population, the disease had not spread. The most likely suggestion was that made by Sir Leonard Rogers that possibly the widespread infection with tuberculosis in Britain in some way or other afforded protection against leprosy. He thought that this idea was to some extent confirmed by what they had been told about the protection against leprosy afforded by vaccination with B.C.G. Of course, the matter was still *sub judice*. J. Lowe said that it had been known for many decades that people with severe lepromatous leprosy suffered frequently from tuberculosis, and in fact the records of leprosy institutions showed that tuberculosis of the lungs was one of the commonest causes of death in such institutions. Lowe

pointed out that that did not disprove the idea of a previous tuberculous infection, particularly an abortive tuberculosis infection which most people had, giving them some protection against a subsequent leprosy infection. In his reply, Sir Leonard Rogers said that there had been a great fall in the occurrence of leprosy in the second half of the fourteenth century following the Black Death, the greatest epidemic of bubonic plague known anywhere. He had found from old records that in any epidemic, even of measles or smallpox, the number of leprosy cases became less. The poor people with leprosy were the first to die when such an epidemic occurred, and they multiplied again later on. Equally important was the improvement in sanitation. This had been an important factor in the dying out of leprosy in Britain after the fourteenth century. He thought there might also be other factors, and the occurrence of tuberculosis was an important one.

Turning to the occurrence of leprosy in Australia, we find that during the twelve months ended December, 1952, 55 cases of leprosy were notified. Three came from Victoria, five from Queensland, 34 from Western Australia, 12 from the Northern Territory and one from the Australian Capital Territory. According to the latest "Year Book of the Commonwealth of Australia", isolation hospitals for the care and treatment of lepers have been established in New South Wales at Little Bay, in Queensland at Peel Island and at Fantome Island, in Western Australia at Derby, and in the Northern Territory at Channel Island near Darwin. At the end of 1952, 17 patients were in residence at Little Bay, 33 at Peel Island, 70 at Fantome Island, 303 at Derby, 179 at Channel Island and five at Wooroloo in Western Australia. Of the 607 patients, 499 were full-blood aborigines, 51 were half-caste aborigines, five were Asiatics, and 54 were Europeans. Clearly, we have a leprosy problem in Australia.

At the Congress discussion already referred to, C. E. Cook said that in the Northern Territory, formerly, the incidence of leprosy among whites at risk in the endemic areas had been estimated at 20 per thousand, one of the highest rates recorded anywhere. Tuberculosis, introduced into northern Australia at the same time as leprosy, attained amongst the natives there an incidence of less than five per thousand by contrast. The incidence of leprosy was 56 per thousand. Discussing the age of infection, Cook said that in many Australian Europeans the age of infection could be determined with reasonable accuracy. In New South Wales the average age lay between twenty and twenty-five years, and in Queensland it approximated thirty years. Leprosy, introduced to the native population of the north about 1890, had continued sporadically as a disease of adults in a restricted tribal area for nearly three decades. With the concentration of native children on missions, the attendant demolition of intertribal barriers, the herding of the uncontrolled and the susceptible under unhygienic conditions, and the debilitation of the natives by imported infections and defective diet, leprosy in aborigines had increased alarmingly in incidence and had become largely a disease of children and adolescents. The eradication of leprosy from Australia calls for two things—first of all, determination to do something, secondly, money. If action is to be taken, a plan of campaign will have to be formulated. On the one hand, we know that rigid segregation tends to bring about a covering up of infections, and it would appear therefore that some wise discrimination has to be made between the segregation of those who are frankly infective to other people and those who are not. Further, the contacts of those who are discovered with infections must be seen and examined at regular intervals. The work in Nigeria has shown that one examination is not sufficient, but that examinations have to be repeated possibly over a period of years. Among the aboriginal population of Australia this examination of contacts will be extremely difficult. It also goes without saying that no measures of examination will be really worth while unless the general living conditions of these people are improved. Sir Leonard Rogers estimates that anything up to 100,000 helpless children are still becoming infected every year quite unnecessarily in British and Indian territories, for want of sufficient leprosaria and other accommodation for the separation of infective patients and clinics for the treatment of those who are not infective. This fact need not occasion any complacency in this country. Rather should an attempt be made to show what can be done. In the matter of money, Sir Leonard Rogers points out that in the nineteenth century Great Britain provided £20,000,000 sterling to abolish slavery from the British dominions. Leprosy, he declares, in the disfigurement and lifelong crippling and blindness which it produces is worse than slavery. Everyone may not agree with this, but we may conclude that money can be found for the eradication of leprosy if such a goal is really the aim.

Current Comment.

LEPTOSPIROSIS IN NEW GUINEA.

THE recent discovery by B. R. V. Forbes and J. S. Wannan[1] of leptospira agglutinins in the blood of natives from most areas in the Territory of Papua-New Guinea must be very disturbing to those who have been practising there, because the data so far available, although they are sectionalized and incomplete, force the immediate conclusion that leptospirosis is endemic in the Territory although it has not so far been diagnosed there. However, if the available data are further analysed, certain paradoxical conclusions are arrived at which indicate that much further investigation is imperative. In their paper "Leptospiral Infection in Natives of Papua and New Guinea", Forbes and Wannan report that during 1953 and 1954, among samples of blood serum from 327 healthy male natives (recruits for the Pacific Islands Regiment) from most parts of the Territory, 188 reacted against one or more of 19 leptospiral antigens in serum dilutions varying from one in 100 to one in 1000. In spite of the fact that leptospirosis occurs frequently in North Queensland and in the East Indies, it has hitherto been accepted that no form of this disease occurs in Papua-New Guinea; incidentally, A. S. Walker, in his exhaustive medical histories of the war,[2,3] makes no mention of its appearance there. Yet these positive results of agglutination tests show decisively that it has occurred there within recent years. Moreover, the distribution is wide, and the occurrence of agglutination in 57% of 327 subjects within a restricted group suggests that the degree of endemicity is very high—the suggestion that there might have been at one time a widespread epidemic among the natives (a

[1] *Australasian Ann. Med.*, February, 1955.
[2] "Clinical Problems of War", Canberra, 1952.
[3] "Middle East and Far East", Canberra, 1953.

possibility, considering the available data), say during the last war, when it might have gone unnoticed, is hardly tenable on epidemiological grounds. Why have cases not been diagnosed? The immediate answer may be that the organism mainly involved is *Leptospira hebdomadis*, which causes the mild Japanese seven-day fever; that New Guinea natives are notoriously resistant to a variety of diseases; and that obviously the disease has occurred only as an inapparent, subclinical infection. But there are difficulties. Leptospirosis is not a disease which normally is passed from man to man. *L. hebdomadis* may be excreted in human urine for six weeks, and human contamination of food or water is not impossible—but field voles are the usual source of infection, and the maintenance of leptospirosis in an area is dependent on the presence of a suitable animal reservoir. Perhaps natives are endowed with a hypothetical resistance, so that each individual subdues the infection as he acquires it (and this should be so, since the infection is virulent enough to stimulate considerable agglutinin formation). But what of the Europeans and Chinese? They cannot have this resistance; the animal vector will not discriminate in their favour; some of them over the years must have contracted the disease and presented recognizable symptoms. Medical standards in the Territory are high, ample aids to laboratory diagnosis are readily available at the larger centres, and most of the doctors are aware that leptospirosis exists in neighbouring countries and might appear in New Guinea at any time (Weil's disease has for years been included in the Territory's list of notifiable diseases). Unless it can be proved that doctors throughout New Guinea have for years grossly failed with a simple diagnosis, then the infection in Europeans and Chinese must be inapparent and subclinical, too. A possible answer to the problem is that in the absence of a suitable host (*Microtus montebelloi* does not occur in New Guinea), *L. hebdomadis* has spread widely through a large area, utilizing some other host, retaining its infectivity for man and its capacity for stimulating antibody formation while losing its power to produce symptoms. In any case, a most interesting situation has been created. Actually, this discussion is all highly speculative, since the only piece of information so far presented does not allow of anything beyond speculation. Forbes and Wannan have stated their intention of extending their investigations to field rodents and marsupials, and also to pigs and dogs, in a search for a reservoir of infection. It would also be of the greatest value if they could examine blood serum from European and Chinese residents of the Territory, and from natives in other age groups; this would offer a much wider perspective of the epidemiology of leptospirosis throughout the Territory. In addition, if details of subjects whose serum causes agglutination could be made available to the hospitals, it might be possible, by checking records, to make some assessment of any clinical features which the disease may have presented.

THE PARIS POLICE AND MEDICAL PRACTICE IN THE EIGHTEENTH CENTURY.

ALL through the ages successive civilizations have found it necessary to establish bodies whose duty it is to preserve law and order among its citizens; and as it is axiomatic that human nature does not change, it seems that the need for such a provision will not disappear this side of the millennium. W. Wyatt Paine,[1] discussing the history of the police force, states that "in a perfect system of civil administration the function of the police should be to curb the liberty of the subject only when it degenerates into licence—and any material variation from the standard is to be deprecated as being arbitrary and tyrannical". Since the members of the police force are themselves human beings, it is certain that those of them who are conscientious upholders of both law and liberty must frequently find it difficult to reconcile their two aims. In short, "a policeman's lot is not a happy one". A brief account of the police force of Paris in the eighteenth century is presented by R. Vaultier,[1] with special reference to its control of medical practice. The information is largely taken from a memorandum on the subject drawn up in 1770 by J.-B. Le Maire, superintendent of the Paris police, at the request of the Empress Maria Theresa. Referring first to health, Le Maire stated that regulations existed for the preservation of this, man's most precious possession. The subjects to which the regulations were chiefly directed were as follows: the duties of wet-nurses in the care of infants committed to their charge; the measures to be taken to preserve the purity of the air and of water in rivers, fountains and wells; measures to control the sale of foodstuffs, and to ensure that they were of good quality; the qualifications of physicians, surgeons and apothecaries; the prevention of charlatans and of other unauthorized persons from compounding, offering for sale or administering any remedy; the carrying out of all measures necessary to check epidemic diseases and to prevent contagion. For the year 1770 that was a fairly comprehensive list of medical responsibilities for the lieutenant of police, de Sartine. (This was the forerunner of the prefect of police; the post was created by a decree of 1667.) Other matters connected with medical practice came within his province. Physicians and surgeons had to present their credentials to him and take their oaths before him. They were forbidden to refuse help to anybody, night or day, and especially were they bound to attend to any wounded persons. They had to report to the police any wounds inflicted by weapons, and also any deaths in suspicious circumstances. They were not allowed to carry out in their own houses anatomical demonstrations on cadavers without permission from the police magistrate, and they had to conform to certain rules relating to the condition of the cadavers and to the time after death at which a body could be opened. Apothecaries also were under police control. Finally, the lieutenant of police had to keep a watch on quacks. Apothecaries had to observe precautions in the sale of certain drugs; arsenic and a number of poisons could be sold only to people known to them, and records had to be kept of the purchasers' names and addresses. Prescriptions had to be carefully verified. Medicines were under strict control—at least, on the surface. A committee of doctors and other persons had charge of their investigation, and approval was then given by the doctors and finally by the lieutenant of police. The lieutenant was much occupied with maintaining the purity of the air and the water supply and the freshness of foodstuffs. (It is known that Seine water was a frequent cause of diarrhœa, especially in visitors to Paris.) During outbreaks of infectious disease it was his duty to take every precaution to prevent contact between the sick and the healthy, and to use all available means to bring the epidemic to an end. Inspectors of police had the task of keeping under observation wet-nurses, ladies of easy virtue and actresses. There is ample evidence that the venereal diseases were widespread in the Paris theatres.

A diverting section of Le Maire's report has to do with Louis XIV and his methods of dealing with quacks. He set up a royal commission to investigate all remedies which the quacks wished to offer for sale. The commission consisted of his chief physician and two of his physicians-in-ordinary, his chief surgeon and two other members of his surgical service, the dean of the faculty of medicine of Paris, and three apothecaries in the city. Those who wished to offer remedies for sale were required to submit to his chief physician the recipes and samples of the medicines for investigation by the commission; if the commission approved their distribution as not likely to do harm, the chief physician issued a certificate of approval. Police officers were empowered to authorize or forbid the sale of powders and pills whose sponsors cried their virtues in the fairs. Every inventor of a panacea had to have his certificate of approval renewed at intervals. The

[1] *Encyclopædia Britannica*, Fourteenth Edition.

[1] *Presse méd.*, February 12, 1955.

unqualified healer was permitted under certain conditions to offer his wares for sale in the market-place only; he had to do this himself. The container of the medicine had to carry on it a list of all the diseases for which it was intended. In his memorandum Le Maire expressed the opinion that these unqualified apothecaries were not dangerous and were even useful, because they made available to the people at low cost ointments and salves which could be safely used because they were made only of plants or of harmless salts.

A few years later another lieutenant of police, Le Noir, energetically expanded the spheres of activity of his predecessors. He made a determined onslaught on the prevailing inadequate public hygiene measures, with particular attention to garbage and sewage disposal. (The emptying of the cesspools usually cost several lives every year.) He had the streets watered, and forbade the use of copper vessels for the transport of milk and of lead-covered counters by wine-sellers. Le Noir also established the police rescue squad. He provided the watch with first-aid kits containing camphorated brandy and smelling-salts, and with woollen cloths for the application of friction to the apparently drowned in accordance with a new method. These first-aid kits were inspected every month. In every police district the superintendent had all the equipment necessary to give immediate attention to anyone injured on the road. It was the responsibility of the police to see that supplies did not run out. Le Noir saw to it that the police had stretchers with mattresses on which to transport the injured or ill to hospital; previously they had used ladders, boards and chairs for that purpose. He envisaged the establishment in every district of a ward, staffed by a hospital surgeon and a midwife, to care for prostitutes taken ill in the street. He appointed permanent medical officers to the *Opéra*, the *Comédie française* and the *Comédie italienne* to be on duty during performances. Perhaps his most striking idea, which he was unable to carry out, was the establishment of an antihydrophobia hospital, to which was to be taken every person within a radius of thirty miles who had been bitten by a dog infected with rabies, or suspected of the infection. Le Noir thought that if this was done, it would be possible to carry out experiments on the animal involved, to observe the patients, and to arrive at a means of curing the disease. (Let it be noted that this was about a century before Pasteur's work on rabies.) Le Noir's vision remained a vision, and he had to content himself with founding a prize, to be awarded for any discovery relating to rabies.

Vaultier comments that what has been recounted in his paper shows only the brighter side of what the police attempted. Control of hygiene was still in its infancy, the Seine still abounded in filth, and prostitutes distributed their treponemata with remarkable facility. In spite of all control measures, charlatans flourished, gave consultations openly and sold their medicines, especially to the poor people, who could not afford to pay a doctor and an apothecary. None the less, the lieutenants of police of whose work we have been told a little deserve unreserved credit for their conscientious and imaginative discharging of their responsibilities.

THE INITIAL TREATMENT OF TRAUMATIC PARAPLEGIA.

IN a paper read before a meeting of the section of orthopædics with the section of neurology of the Royal Society of Medicine last year, L. Guttmann[1] discussed the initial treatment of traumatic paraplegia following closed injuries to the spine. He did not attempt to describe all the details of the subject, but dealt with two important aspects: first, the management of the fractured spine, and second, the management of the paralysed bladder. The practical points brought forward warrant consideration.

[1] *Proc. Roy. Soc. Med.*, December, 1954.

Dealing with the management of the fractured spine, Guttmann pointed out that the degree of vertebral deformity resulting from fractures and fracture-dislocations of the spine was not the crucial factor for the establishment of excellent functional results. Whilst it was desirable in such injuries involving the spinal cord and its roots to bring the displaced vertebræ into the best possible alignment, forced manipulative procedures in the initial stage must be avoided, as they might irreparably damage the cord or its roots, which were perhaps only mildly contused or suffering mere concussion from the injury. Guttmann and his colleagues at the National Spinal Injuries Centre at Stoke Mandeville Hospital, Aylesbury, have shown that considerable recovery of the cord or *cauda equina* may occur in the presence of bone displacement without immobilization of the paralysed patient in plaster casts or plaster beds. At Stoke Mandeville, the initial treatment of these patients is to place them on "Sorbo" packs with two or three additional pillows under the fracture to produce hyperextension in the physiological position and to restore the normal curvature. From this basic supine position, the patient is turned first on one side, then back to the supine position, then onto the other side, every two hours, day and night. Care is taken that the patient is turned in one piece, and the turning is carried out by a trained staff. Plaster casts and plaster beds are not used at the National Spinal Injuries Centre for external fixation, as pressure sores will always eventuate, whereas pressure sores never develop when the "Sorbo" pack method is correctly used. Guttmann regards the method of open reduction followed by internal fixation by metal plating as not a satisfactory form of initial treatment in stabilizing the fractured spine with cord or *cauda equina* involvement; moreover, he considers it quite unnecessary.

From experience of management of the paralysed bladder gained at Stoke Mandeville Hospital in the treatment of 704 traumatic paraplegics, Guttmann has reached the conclusion that the routine performance of suprapubic cystostomy in injuries of the spinal cord and *cauda equina* is contraindicated. It has been shown in both Malaya and Korea that, even under the most trying battle conditions, proper urethral catheterization can be carried out. Guttmann's view is that in those patients in whom suprapubic cystostomy has been carried out, the sooner suprapubic drainage is discontinued the better is the chance of recovering good bladder capacity and satisfactory bladder control as well as of avoiding urinary infection. The initial procedure now practised at the Spinal Injuries Centre for the management of the paralysed bladder is on the following lines. The first stage is that of non-interference by instrumentation. In the first twenty-four hours no instrumentation is performed, but repeated attempts are made to elicit emptying of the bladder by gentle manual pressure upon the bladder region combined with digital rectal massage. The second stage is that of bladder drainage by intermittent or continuous urethral catheterization. If voluntary or reflex micturition is not established within twenty-four hours, drainage of the bladder is performed with scrupulous aseptic care. At first the bladder is catheterized intermittently every eight to twelve hours with a Foley catheter, size 16F in adults. This intermittent catheterization is used to allow the urethra to become accustomed to the foreign body, as early continuous catheterization may produce a pressure sore in the posterior part of the urethra with consequent infection and fistula formation at the penile scrotal junction. By this method, the urine can be kept sterile for many weeks; and then, in cord lesions, the automatic bladder may return. However, if infection does occur, an indwelling catheter is used with daily bladder washouts or tidal drainage. The indwelling catheter should be changed at first every day, and then at intervals of two or three days. Once the automatic bladder has been established, the indwelling catheter is removed and intermittent catheterization resumed until detrusor action is powerful enough to empty the bladder or leave only a small amount of residual urine.

Abstracts from Medical Literature.

PHYSIOLOGY.

Occupational Deafness of Flight Radio Operators.

A. R. DE C. MONTEIRO (*J. Aviation Med.*, October, 1954) reports observations concerning audiometric measurements made on a group of radio operators with more than five years of service and more than 5000 hours of flight time, and another group with less than five years of service and less than 5000 hours of flight time. He presents for comparison observations on another group of candidates for radio operators and a group of commercial pilots. He draws conclusions about the effect of radio and aeroplane noise upon the ears as factors of fatigue. He discusses the question of occupational deafness caused by the noise of radio. As a result of his observations and considerations he concludes that radio noise causes occupational deafness, and also that the noise of the aeroplane is an important factor, which may increase the deafness of flight radio operators.

Effect of Complete Ureteral Obstruction of Kidney Function.

W. S. KERR (*J. Appl. Physiol.*, June, 1954) reports that the effects of complete ureteral obstruction for seven days on renal function and the degree and rate of improvement which followed release of the obstruction have been evaluated by renal clearance methods in dogs. One hour after release of the right ureter, the glomerular filtration rate and effective renal plasma flow of the previously obstructed kidney were found to be 25% and 27%, respectively, of the pre-ligation control value, and the glomerular filtration rate and effective renal plasma flow of the control (left) kidney were found to be increased to 165% and 167%, respectively, of the control value. The variations in degree of depression of function and the time of and degree of maximum recovery suggest that the degree of damage caused by ureteral obstruction for one week varies. Subsequently, the glomerular filtration rate and effective renal plasma flow of the kidney improved, and the clearances of the control (left) kidney decreased. Ultimately, the fraction contributed by each kidney became constant. Maximum recovery occurred in four to fifty-seven days. Thereafter, the ratios of the glomerular filtration rate and effective renal plasma flow of the right kidney to those of the left kidney remained essentially unchanged. In one dog clearances were determined at intervals for four hundred and forty-two days after the ureteral obstruction was released. The control (left) kidney of two dogs was removed two days after the right ureter was released to determine the pattern of recovery that the right kidney would show when it had to do the work of both kidneys. Under this circumstance, the glomerular filtration rate and effective renal plasma flow of the right kidney improved more promptly and to a greater degree than occurred in the presence of the control kidney. Fluctuations in the T_{mpah} in the control periods and after release of the ligated ureter were so variable that no significant trends were observed. The ability of the previously obstructed kidney, both in the absence and in the presence of the control kidney, to concentrate urine was impaired. The ability to dilute urine was not impaired. The ability of the right kidney to produce either alkaline or acid urine was not reduced.

Relation of Function to Diameter in Afferent Fibres of Muscle Nerves.

C. C. HUNT (*J. Gen. Physiol.*, September, 1954) reports that a method of isolation of individual afferent fibres from muscle has yielded a representative sample of the fibres which comprise groups I (12μ to 20μ) and II (4μ to 12μ) of the afferent fibre diameter distribution of muscle nerves in the cat. Afferent fibres from muscle stretch receptors account for groups I and II of the afferent diameter spectrum of muscle nerves to the soleus and medial gastrocnemius muscle fibres. Nerve fibres from tendon organs are largely confined to the diameter range above 12μ. This fibre group, which has a simple one-peak diameter distribution, is termed group Ib. Fibres from muscle spindles show a bimodal diameter distribution and account for the remainder of fibres in the 12μ to 20μ group (termed Ia) and substantially all of group II (4μ to 12μ). No significant difference has been found in the receptor characteristics of the large (group Ia) and intermediate-sized (group II) spindle afferent fibres other than a slightly higher threshold of the latter to steady external stretch.

Body Temperatures of Arctic and Subarctic Birds and Mammals.

L. IRVING AND J. KROG (*J. Appl. Physiol.*, May, 1954) report that the resting body temperature has been measured in 22 species of arctic and subarctic mammals and in 30 species of birds in arctic and subarctic Alaska. Many measurements were made in the field in arctic winter temperatures, and some have been made under even colder experimental conditions. Resting body temperature is taken as that which prevails by day when animals are alert and not in strenuous activity. Series of observations show that from 20° to —30° C., and in some cases below—50° C., the individuals of a species maintain the same body temperature within a range of about 2°. Measurements of birds were not as extensive as those made on mammals, but no greater variation appeared among individuals of avian species. The mean temperatures of all the arctic and subarctic species of mammals which were examined differed within a range of 2·2°. Among avian species the difference was only slightly greater. The average of the mean body temperatures in 19 mammalian species which were observed in good resting condition was 38·3° C. The average of all observations of the mean body temperature of 30 avian species was 41·1° C. The distribution of mean temperatures of the various species of birds and mammals about the means of their respective classes bore no relation to the weight of the animals. The birds weighed between 10 and 2000 grammes; the mammals weighed from 0·1 to 1000 kilograms. It is apparent that each species has its own temperature and that the species of each class are in separate groups in regard to level of temperature regulation. The mean of body temperatures of the northern mammals was 0·5° higher than has been summarized by Morrison and Ryser from records of 56 species of mammals of temperate regions. The mean of the species of birds examined in Alaska was 0·5° lower than was summarized from Wetmore's report on the temperature of birds in the temperate United States. These small opposite differences cannot be ascribed to climate or method, and may be the result of sampling from the limited number of arctic and subarctic species. Arctic and subarctic birds and mammals keep their resting body temperatures stable in the great variety of arctic temperatures, which require extreme flexibility in the variable physiological functions concerned with the regulation of animal heat.

A Theory of Taste Stimulation.

L. M. BEIDLER (*J. Gen. Physiol.*, November, 1954) reports a mathematical analysis of existing quantitative data concerning the stimulation of chemoreceptors by salt solutions. He states that the treatment in this paper of available quantitative data on the response of taste receptors to sodium salt stimulation clearly indicates that the ions of the chemical stimulus are loosely bound to some substance of the taste receptor. This can be thought of as an initial reaction which ultimately leads to stimulation of the receptor and eventual depolarization of the associated sensory neuron. The speed of the total reaction suggests that the receptor substance is located on or near the surface of the receptor. The enzymatic reactions for chemoreceptors recently proposed by A. F. Baradi and G. H. Bourne do not appear plausible for sodium salt stimulation of the taste receptors of the rat.

Responses of Unacclimatized Men Under Stress of Heat and Work.

C. H. WYNDHAM, N. B. STRYDOM, J. F. MORRISON, F. D. DU TOIT AND J. G. KRAAN (*J. Appl. Physiol.*, May, 1954) report that during work the rectal temperatures of raw recruits rose to new equilibrium levels. These recruits were African labourers. The new levels were closely related to the rates of work, and in certain air temperature ranges (namely, up to 90° F. during light work, up to 87° F. during moderate work and up to 84° F. during hard work) they were uninfluenced by changes in wind velocity. During rest and during work in various degrees of environmental heat stress, the level of rectal temperature of raw recruits was uniformly higher (namely, 1·3° F.) than that of acclimatized men. This difference gives acclimatized men an advantage of 3° to 6° F. in saturated air temperature over that at which similar rectal temperatures will be attained by raw recruits. The differences in response

of raw and acclimatized men when exposed to various degrees of heat stress can be explained by the more sensitive setting of the thermostatic control of sweating by the central thermosensitive centres.

BIOCHEMISTRY.

Cholesterol.

M. BLECKER AND S. GURIN (*J. Biol. Chem.*, August, 1954) have studied the conversion of aceto-acetate-1-C^{14} to radioactive cholesterol in rat liver slices. It has been demonstrated that aceto-acetate is not incorporated into a single or limited portion of the cholesterol molecule. The methyl carbon atom of aceto-acetate is a source of carbon atoms 17, 18 and 19 of cholesterol, while the carboxyl carbon atom of aceto-acetate is a precursor of carbon atom 10. Evidence is presented that the incorporation of singly labelled aceto-acetate into cholesterol follows the same pattern as is exhibited by singly labelled acetate. Evidence has been obtained suggesting that aceto-acetate cannot bei ncorporated into cholesterol as an intact 4-carbon unit without equilibration with 2-carbon fragments at some stage of the biosynthesis.

Fructose.

R. HILL *et alii* (*J. Biol. Chem.*, August, 1954) have compared the response of plasma glucose content to orally administered glucose (glucose tolerance test) in three groups of normal rats: (i) those fed for three days with an adequate diet containing 58% of glucose as the sole carbohydrate, (ii) those fed for the same period with a diet containing 58% of fructose, and (iii) those fasted for ninety-six hours. An impaired capacity to utilize glucose was observed in the fructose-fed rats. The glucose tolerance curves in these rats resembled those in the fasted rats. The evidence obtained from studies on the utilization of C^{14}-labelled compounds by liver, kidney and brain and of glucose uptake by diaphragm suggests that the increase in glucose tolerance observed in the fructose-fed rat is the result of impaired liver glucokinase activity. Insulin administration, even for as long as three days before the fructose-fed rats were killed, failed to augment the ability of their livers to oxidize glucose to carbon dioxide. These findings are considered as a manifestation of enzymatic adaptation to diet.

ACTH.

F. ULRICH *et alii* (*J. Biol. Chem.*, July, 1954) have studied the effects of prolonged administration of growth hormone, ACTH and throxine on the metabolism of plasma albumin in adult hypophysectomized rats with S^{35}-labelled albumin. In such rats the initial effect is a decrease in the rate of albumin synthesis. The replacement rate in the normal rat is about twice as high as in the hypophysectomized animal. Treatment of the hypophysectomized animal with growth hormone results in a great stimulation of albumin synthesis, so that the replacement rate is increased twofold or more. Thyroxine does not potentiate the effect of growth hormone. Treatment of the hypophysectomized animal with ACTH results in an initial increase in the rate of albumin degradation together with an insignificant effect in the direction of increased replacement rate. Growth hormone and ACTH, administered to the hypophysectomized animal, have antagonistic effects. Under the conditions of these experiments the replacement rate was increased by a combination of the two.

Aminopterin.

Z. MILLER (*Arch. Biochem.*, June, 1954) has reported that administration of aminopterin to mice causes a great reduction in the oxidation of choline and formaldehyde by liver homogenates. The anaerobic oxidation of choline by ferricyanide is affected to only a slight degree. Diphospho-pyridine nucleotide (DPN) increases the endogenous respiration of livers from normal and aminopterin-treated mice by essentially the same amount. The DPN-stimulation of choline oxidation by livers from aminoprotein-treated mice is far below the corresponding value in normal mice. Succinoxidase, cytochrome oxidase and malic dehydrogenase are not influenced by aminopterin administration.

Cortisone.

R. K. BOUTWELL AND R. CHIANG (*Arch. Biochem.*, June, 1954) have determined the specific activity-time curves of blood glucose and respiratory carbon dioxide in normal and cortisone-treated mice after a single intravenous injection of radioactive glucose. Within four to six hours after treatment with cortisone, the turnover time of glucose was extended by 50%. The amount of glucose utilized by the treated mice was calculated to be 65% of normal. The reduction in glucose utilization was attributed to a depression in glucose oxidation as well as in the quantity of glucose lost to other metabolic pools.

Œstrone.

W. PEARLMAN *et alii* (*J. Biol. Chem.*, August, 1954) have determined the amount of œstrone, œstriol and œstradiol in urine and also the deuterium content of the respective œstrogens, following the administration of 6,7-d_2-œstrone acetate to pregnant women. From these data it was calculated that the amount of administered œstrogen recovered in the urine as œstrone, œstriol and œstradiol was very low (total œstrogens 5·6%, 9·3%, 12·7% in three experiments), being of the same order of magnitude as that previously found to occur in man. These findings are contrary to expectations based on a current theory that progesterone influences the course of œstrone metabolism during human pregnancy.

Beryllium.

A. LINDENBAUM *et alii* (*Arch. Biochem.*, September, 1954) have tested more than seventy different substances to ascertain the relations between the number, kind and position of functional groups, and the ability of an organic molecule to reverse two biological effects of beryllium—the inhibition of plasma alkaline phosphatase and death in acutely poisoned mice. All compounds that failed to reverse the beryllium-induced inhibition of the enzyme also lacked antidotal activity. On the other hand, a compound that reversed the enzymatic inhibition did not necessarily protect mice from beryllium poisoning. The effectiveness of a molecule in reversing the biological effects of beryllium is dependent upon a number of chemical and biological factors, including the ability to form a stable five-membered or six-membered chelate ring with beryllium, molecular size, presence of hydrophilic groups, proton affinity of chelating groups, metabolism and toxicity.

Physostigmine.

M. E. GREIG AND M. CARTER (*Arch. Biochem.*, September, 1954) have demonstrated that physostigmine caused an increased rate of entrance of barbital into guinea-pig brain slices. In the concentration used, physostigmine inhibited the activity of the brain cholinesterase by about 90%, but had little or no inhibitory effect on glycolysis or oxygen consumption by the brain tissue. The increased permeability of the guinea-pig brain slices to barbital caused by physostigmine is attributed to its action on cholinesterase.

Salicylate.

E. H. KAPLAN *et alii* (*Arch. Biochem.*, July, 1954) have reported that salicylates and benzoates inhibit the tricarboxylic acid cycle in kidney and liver homogenates. The oxidative enzymes inhibited to the greatest extent are α-keto-glutaric dehydrogenase and succinic dehydrogenase. Inhibition of the former is reversed by the presence of excess magnesium ions. The two enzymes also differ in the relative inhibitory effects of other substances chemically related to salicylate. Inhibition of oxidation of succinate is also reversible, but the factor which reverses this inhibition is unknown. When magnesium is present in excess, salicylate may enhance oxidative activity.

M. J. H. SMITH (*Biochem. J.*, January, 1955) has reported on the effects of the addition of salicylate, adrenocortical extract, cortisone and hydrocortisone on the glycogen content of rat-liver slices incubated in buffered physiological salt solution. Salicylate caused a significant increase in the glycogen disappearance in liver slices incubated in a medium containing a high concentration of potassium and no sodium, but not in a medium containing a high proportion of sodium. Adrenocortical extract, but not cortisone or hydrocortisone, produced a significant decrease in the glycogen disappearance, and this effect was inhibited by the presence of salicylate.

Formic Acid.

E. F. ANNISON (*Biochem. J.*, December, 1954) has identified formic acid as a constituent of sheep blood which normally accounts for 10% to 30% of the molecules of volatile fatty acid present. Evidence was obtained that formic acid was present in human blood and in the blood of some other animals at concentrations similar to those observed in sheep blood. The examination of the volatile fatty acids found in the alimentary tract of the sheep suggested that the formate in the peripheral circulation was probably not derived from this source.

Public Health.

A REPORT ON PUBLIC HEALTH ABROAD.

DR. A. R. SOUTHWOOD, Director-General of Public Health for South Australia, with the approval of the Honourable, the Minister for Public Health, has made available his final report on his observations during his study tour abroad in 1954. Much of this extensive report is purely of departmental or general interest. The following extracts are considered to be of interest to readers of the journal and are published without comment.

Infectious Diseases.

The use of ultra-violet lamps in schools had been suggested as a method of reducing the incidence of infectious diseases in children. Experiments extending over three years under the British Medical Research Council's supervision showed the scheme to have no appreciable value.

Hospitals for infectious diseases in most places are less in demand. Unless something unexpected happens there will soon be little need for large permanent hospitals for infectious diseases. To have a small section of a general hospital available for patients needing isolation will suffice, as was the case in Adelaide, for instance, forty years ago. In many places large infectious hospitals are being used, in whole or part, for other purposes: for chronic diseases, special research purposes or, as at Pittsburgh (United States of America), a school of public health.

Tuberculosis.

It is clear that the present intensive war on tuberculosis cannot be given all the credit for the gains being made. Improvement was already taking place before X-ray surveys, B.C.G. vaccine, and streptomycin and other new treatments came into use. Better hygiene, climate, exercise, open-air life, good food—all those must have helped. The new drugs and the other modern weapons have given hope for victory. There is still another factor. Tuberculosis, like other infections, probably has a sort of periodicity—an epidemic rise and fall. The epidemiology of tuberculosis still needs study. There are many questions awaiting answer. For instance, is the improvement we now see really the nadir of a long-drawn out pandemic? Is tuberculosis now waning just as an epidemic of measles wanes, but in a slower, less dramatic way? Are we just viewing the natural life history of a tuberculosis epidemic?

Venereal Diseases.

In England there appears recently to have been a reduction in the incidence of syphilis, but an increase in that of gonorrhœa and of non-gonococcal urethritis. In his 1953 report, Sir John Charles comments that the symptoms of non-specific venereal urethritis are often minimal and it is probable that many persons are infected unknowingly and consequently are never treated. It is being increasingly realized that it is equally important to investigate and treat female consorts of men suffering from non-gonococcal urethritis as of those with gonococcal infections.

Industrial Medicine.

In factory planning, health and safety are important items. The major risks now are not injuries from moving machinery, but those from toxic dusts and vapours of various kinds. New processes in industry usually involve the use of new chemical substances. Moreover, the risks are not always clear cut and obvious: they are frequently insidious and inapparent. Industrial medical officers have become vigilant in detecting minor conditions of illness which may become major problems. Especially in the United States, schools of public health are giving much attention to the study of industrial medicine: at Boston (Harvard) and Pittsburgh the interest is keen.

Atmospheric contamination in factories is being widely studied. Some authorities deprecate the idea of "safety levels" for various contaminants: they say the aim must be to reduce all contaminants to zero. The multiplicity of hazards, and the cumulative effects, are important. The combined effects of small amounts of many toxic agents may be damaging, and even disastrous.

Effective precautions against the risks are available. It has been said authoritatively that "the worker in an atomic energy plant is safer from the occupational hazard characteristic of his jobs than the worker in any other industry. Danger certainly exists, but it can be, and is, brought under complete control. The rules laid down to ensure protection against radiations are such that a worker who obeys them has no chances of coming to harm in thirty or forty years of work—the highest standard ever set by an industry".

Fortunately the safe working methods involve fairly simple protective devices. A very important point is the education of the worker in the nuclear fission field in the reasons for avoiding unnecessary or prolonged exposure to radiations and radio-active materials.

Uranium itself, even in highly concentrated state, involves no risk in its ordinary handling, so I was assured by a British expert. Dust from working with uranium is also not a hazard of consequence, for the metal is very heavy; it is, of course, wise to control the dust hazard in uranium working. The risks from uranium—such as they are—are toxic (heavy metal) effects rather than from radiation, for uranium in its natural state is not highly radio-active. It has been said that the only naturally occurring nuclear fuel is uranium 235, yet this constitutes only 0·7% of natural uranium metal, the remaining 99·3% being uranium 238.

In the handling of uranium metal, air-borne contamination, a potential hazard, can be controlled by proper ventilating equipment associated with the apparatus producing dust or fumes. Those handling the metal to any great extent are advised to wear leather gloves while so doing, and to wash hands and face thoroughly after work.

Disposal of radio-active wastes has proved a vexatious problem. Indiscriminate disposal would make a serious general health hazard. Burial of material in selected out-of-the-way areas, disposal at sea in sealed containers, or dilution in sea water are some suggested methods. One idea is that ultimately the disposal of the more dangerous material may be by way of rockets fired out of the earth's gravitational orbit!

Increasing use of radio-active substances in medicine especially of the radio-active isotopes, makes it desirable that the general public should have some knowledge of the risks and how to meet them. The possibility of atomic warfare also supports that view. The problem is how to inform the man in the street of the nature of the risks without alarming him. At the Naples Congress one representative said that the general public had become "unduly alarmed" about the risks of handling radio-active materials; he thought that it would be wise to change the name of "atomic energy plants" to "nuclear energy establishments".

The health physicist has become an important man in the study of radiation risks. His job is to make sure that the precautions against explosions are effective, and that no one can be exposed to more than a tolerance dose of radiation or of radio-active material, inside or outside the works. He makes radiation surveys of the factory, its personnel, and its surroundings, measuring the intensity of the radiation at various points.

The health supervision of persons exposed to radiation hazards in the atomic energy plant, in so far as their radiation exposure is concerned, is under the direction of health physicists. Those experts are actively engaged in research to determine the effects of radiation, the permissible limits of exposure, the development of protecting measures, the safe disposal of waste products, and the development of radiation detection equipment.

In industries where the radiation hazards are not great, the supervision of radiation exposures is the responsibility of the industrial hygienists, who should have special training in health physics. In medical and other institutions using radio-active isotopes, it is usual for radiation protection committees or specially trained persons to supervise the use of radio-active materials.

The excellent record at the atomic energy plants in regard to radiation illness is a tribute to the work of the health physicists and others who have participated in the health protection programme. It has been well shown that dangerous radiation exposures can be adequately controlled if a sound preventive programme is followed.

Irradiation and Malignant Disease.

In New York City the Health Department is promoting a self-swabbing service for women, to assist in the early diagnosis of cancer of the *cervix uteri*.

Developments in apparatus continue. By the use of megavoltage instead of the routine deep X-ray machines it is now possible to give precise doses of high quality to deep-seated tumours with safety and with the minimum of skin reaction. Megavoltage rays are produced by massive and intricate devices such as the linear accelerator. The atomic

pile, and other developments from nuclear physics, are making possible simpler and cheaper means of producing penetrating rays of high energy and good quality.

Radio-active cobalt 60 appears at present the source of much promise. The people of Canada have given the people of Britain, through the British Empire Cancer Campaign, a cobalt 60 rotational beam therapy unit. This apparatus contains about 1000 ounces of cobalt, raised to high specific activity in the Canadian atomic energy plant at Chalk River. It is equal in effect to 1500 grammes (50 ounces) of radium: the total amount of actual radium for therapeutic purposes in Britain is less than 200 grammes. The unit is the first of its kind in Europe.

Nutrition.

The decontrol of cereals in 1953 permitted the milling and use of flour of any extraction, provided that flours were "fortified" by the addition of enough bran, thiamine and nicotinic acid to bring the flour content of those substances to specified levels. The three substances were called "token nutrients". It was recognized that at least nine or ten other factors are important and that low extraction flour may be deficient in some of them. However, if the "token nutrients" are present in adequate amounts it may be assumed that the other factors of the vitamin *B* complex are also there. Bread takes such a prominent place in the ordinary dietary that it is well to be assured of its wholesomeness.

Chemical additions to food and food sophistication in general, are a constant problem for health authorities. The addition of antioxidant chemicals to fatty preparations, to prevent their becoming rancid, had been tested. British experts suggested that two antioxidants, propyl gallate and butylated hydroxyanisole (BHA), might be used with safety; naturally occurring antioxidants, such as tocopherol, lecithin and citric, tartaric and ascorbic acids, would be unobjectionable. The two chemicals suggested are efficient antioxidants, and they do not cause harmful effects or impart extraneous flavour to foods.

Colouring matters added to foodstuffs also come for attention. The general fear associated with the use of additives is that some illness may be caused in the consumers. The special concern is that some additives, especially the colours of the aniline group, have been proved by experiment to be possible causes of cancer.

Fluoridation of Drinking Water.

A curious state of mottled enamel was found a few years ago to be associated with a high concentration of fluorides in the water supply, generally well over two parts per million. Later it was noted that, in places where the fluoride concentration was about one part per million, dental decay was less frequent than in places where the fluoride amount was lower. Moreover, at that concentration mottling of teeth did not occur. From those observations it was decided in the United States to add fluorides to water supplies low in fluoride content, bringing the concentration to the level of about one part per million.

The controlled studies in North America appear to have been highly favourable. Reduction of caries of children's teeth by 20% to 30%, compared with that found in adjacent towns used as "controls", were noted within two to four years of beginning fluoridation. The chemicals used have been sodium fluoride and sodium fluosilicate—the latter is cheaper and less toxic.

Dental Nurses.

In New Zealand there has been developed a method which has provoked world-wide interest. The scheme for training and using school dental nurses has now been in practice in New Zealand for over thirty years. It has been watched with interest by health authorities everywhere.

The arrangement is for school dental clinics to be operated by dental nurses, employed and trained exclusively by the Department of Health. The training period covers two years (1608 hours). The trained dental nurse, under the general supervision of a dental officer of the health department, examines, extracts and fills teeth, treats gums, and conducts dental health education. She deals with children of elementary schools and the pre-school children.

In 1950 an investigation under the World Health Organization direction found that "New Zealand's public dental programme has gained a large measure of success in controlling the effects of dental caries in school children". In 1950 also the British Government sent a party of medical and dental experts to study the scheme. Their unanimous opinion was that within certain limits the training of the New Zealand school of nurses gave a high standard of technical efficiency in the treatment of children, the system meeting an urgent need. Acting on their report, the British Government instituted a five-year experiment in the training and use of dental nurses (dental hygienists). The British Dental Association gave full support. In all, 100 hygienists were trained at the Eastman Dental Hospital. They are now working in the public dental service—in local authority clinics, and in dental hospitals.

Infant Welfare.

Psychological features have become important in infant welfare work. Today there is a better understanding of the nutritional needs of babies and the difficulties of feeding are more rapidly overcome. But there are other problems of conduct rather than infection. It is now recognized that, even (or perhaps especially) with young infants, psychological conditions matter. Behaviour problems, as well as feeding problems, have to be solved by the baby welfare nurse.

In those psychological disturbances, as in the feeding disorders, the instruction of the parents is the main line of treatment. Even in pre-natal clinics thought must be given to the "emotional setting in which a child is to mature". It is accepted that the emotionally well-adjusted mother produces a child with fewer complications than the disturbed anxious mother.

What is termed "the concept of anticipatory guidance" appears "again and again as a basic technique in mental hygiene in public health, from the situation in prenatal care, to the preparation for retirement in old age".

The idea that mental health is an important condition in baby clinics is not new to those who have studied and worked with young children. The new feature is that the concept is becoming increasingly accepted. At maternity and child welfare clinics the practice of preventive psychiatry—anticipatory guidance—has increased astonishingly. At Vancouver, B.C., under the leadership of the Director of the Mental Hygiene Division of the Vancouver Health Department, the work has made such progress as to make it a model for other places. In England something on the Vancouver lines has developed. The aim, according to Sir John Charles, is for a psychiatrist to train the professional staff of the centres rather than for himself to have direct contact with the mothers. Some clinics are arranging evening sessions to enable fathers to attend. Schools for fathers are likely to supplement mothercraft schools. The baby clinics are likely to become a true preventive service in the field of mental as well as physical health.

School Health Services.

The School Health Service included the usual arrangements for periodic medical and dental inspections, and for the follow-up of any necessary treatment. In recent years doubt has been raised as to the value of repeated medical inspections of school children. Some critics suggest that, after the school entry medical examination, departures from normality might be detected by school nurses and teachers. The selected children would then be referred for medical reexamination.

Geriatrics.

A few years ago an International Association of Gerontology was formed, and its meetings attract researchers and administrators from most countries. The sessions held in London in 1954 were crowded and enthusiastic. My impression was that the United States representatives at the Congress were devoting attention mainly to the research and sociological aspects, the Continental members were concerned especially with research. The British members stick to the practical "treatment" of the problems.

In England the work of assisting elderly people is shared by official and voluntary bodies. Many local authorities provide homes for the elderly; some are large institutions, similar to our Old Folks' Home, while other modern homes—often large private houses converted for the special needs—provide only for twenty or so residents. Health visitors of the local health authority's staff do valuable work in helping in the care of old people in their own homes. In addition, many voluntary bodies are active in the field. Church organizations provide homes and other amenities, such as old people's clubs and similar social schemes. The Women's Voluntary Service, organized throughout Britain, provides "meals on wheels", laundry and shopping assistance, chiropody and other care. Medical practitioners are taking greater interest in geriatrics; they know the home conditions

and the health status of their elderly patients, and they are able to assess the needs. More than anything else, the cooperation of official and voluntary bodies, and the general practitioners, will advance the care of the elderly.

The Chronically Sick.

Hospitals in most parts of the world have, in the last twenty or thirty years, experienced—as we have at the Royal Adelaide Hospital—the accumulation of patients with long-lasting illnesses in the wards accustomed to sheltering those with acute or subacute illnesses. That circumstance has arisen from several causes. An important one has been the progress in medical science—patients with acute illnesses are saved, but may require long-term treatment before becoming fit to leave hospital. The patients with chronic diseases, such as heart failure or diabetes, are rescued from the serious phases of their illness, but recurrences of complications may need repeated admission and long treatment in the hospital ward.

Another cause has been the difficulty in obtaining nursing and other help in private homes; sick people of the type previously looked after at home are sent to hospital. That applies especially to elderly patients for whom adequate home care is often hard to get.

Can such difficulties be met, without going on as we do, with overcrowded wards and hampered efficiency? Several ways have been tried. Hospitals for the chronic sick, homes for "incurables", and geriatric wards provide one means. Special "chronic" wards as part of the general hospital offer a similar way. In New York the Montefiore Hospital, under the enthusiastic "drive" of Dr. E. M. Bluestone, has developed a home visiting service as part of the hospital's work. The scheme appears to have the cooperation of private practitioners, and it has relieved the strain on hospital bed space. Discharged patients are followed to their homes, and after care is given by members of the hospital's medical and nursing staff.

Special clinics in the hospital out-patient service can do much to reduce the strain on in-patient accommodation. Diabetic patients, for instance, if well trained and supervised, may avoid many of the complications which require in-patient care.

Some return to the home treatment of illness seems desirable and practicable. Not every illness requires the elaborate accessories of the modern stream-lined hospital. There is still an opportunity for simple means of treatment to be effective in many illnesses. Moreover, a big proportion of people are happier if treated at home, and their recovery may be quicker and more durable on that account.

Rehabilitation.

The special rehabilitation centres I saw at Oslo, in New York and in Vancouver were all working along similar lines, giving attention to psychological as well as physical aspects. The results appear impressive. Patients are brought to see that all is not lost, and that useful and satisfying life can be regained. Recovery comes not just from lapse of time, but from the wise use of that time, spending it in training and in getting adjusted to altered circumstances.

Some rehabilitation centres are conducted as part of the activities of the "acute" hospital, as a highly developed physiotherapy unit. In other cases the centre appears a distinct and separate unit. Whatever the administrative arrangement, it is necessary that the work of the centre should be linked closely with the hospital clinics. Rehabilitation means more than physiotherapy and orthopædic clinics, for it must attend to the recovery of the whole patient.

The most important development in the field has been the realization that, if proper treatment of disability is to become an integral feature of hospital work, it is essential that at every important hospital a responsible member of the medical staff should be nominated to supervise the rehabilitation service. Usually he is the specialist in physical medicine or one of the physicians or surgeons especially interested in the subject. Moreover, rehabilitation is carried out not by individuals but by a team, and the medical man is the captain of this team. He trains the members of the team, supervises the rehabilitation programme of patients referred to the department, and ensures that there is adequate cooperation with the resettlement services outside the hospital and with many other social services now available.

Health Visitors.

Health visitors in Britain are trained nurses who have done special post-graduate studies for a year and passed an examination in public health subjects. The *National Health Service Act*, 1946, makes it obligatory upon local health authorities to provide health visitors "for visiting persons in their homes for the purpose of giving advice as to the care of young children, persons suffering from illness and expectant or nursing mothers, and as to the measures necessary to prevent the spread of infection". "Illness" includes "mental illness and any injury or disability requiring medical or dental treatment or nursing". The scope of the health visitor's work is increased so that she is concerned with the health of the household as a whole, and she has an increasingly important part to play in health education. An amended syllabus of training, which lays a greater emphasis on the social aspects of the health visitor's duties, came into operation in 1950. She works in the closest cooperation with the family doctor and does not encroach on the province of the nurse provided under the authority's home nursing scheme or the sanitary inspector. At the end of 1948, 1976 whole-time and 3467 part-time health visitors were employed by local health authorities and 17 whole-time and 253 part-time were employed by voluntary organizations.

In the United States major health authorities, such as those of large cities, have large nursing sections. Special public health training for nurses is available in the graduate schools of public health, and a diploma of Master of Public Health may be obtained. The degree of B.Sc. in public health nursing is also available in some universities.

Health nurses have an established place in public health work today. Suitably trained, they are able to conduct some of the work formerly entrusted to doctors and this enables some economy of professional services to be made.

It appears likely that health visiting, on the lines being developed actively in Britain now, will become accepted everywhere and steadily expanded. The widening range of public health work requires the aid of large staffs of highly qualified nurses if it is to serve its highest community functions.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

NATIVE SUPERSTITION.

[From "The History of New South Wales including Botany Bay, Port Jackson, Parramatta, Sydney and All its Dependencies from the Original Discovery of the Island with the Customs and Manners of the Natives and an Account of the English Colony from its Foundation to the Present Time: by George Barrington, Superintendent of the Convicts", London, 1802.][1]

THAT these people should be superstitious must be naturally expected: they are certainly superior to brutes: and all those in the intermediate steps from ignorance to knowledge must ever be so, and perhaps there are many who value their own refined knowledge, who are not free from this weakness. The Cam-mer-ray car-rah-dy (priest) who performs the operation of producing the bone in the tooth drawing ceremony would alone establish the fact, but others as strong can be produced.

A native who had been wounded by a spear met with one of these conjurers before it was well, who made him believe he still had the barb in his side: however, to show his vast power, he pretended to take out what was not there and sent the poor fellow away satisfied with his great importance. One of the female natives who lived in the Colony had been out and returned ill, though nothing seemed to be the matter with her: but she said one of the Cam-mer-ray women made water in a path she was obliged to come over and this made her ill: however, it had such an effect on her weak mind that she did not recover although Mr. White kindly bled her in the arm: but the disease which superstition caused was overcome by the same weakness which was effected by her being placed on the ground and a string tied round her head; the other end of the line being

[1] From the original in the Mitchell Library, Sydney.

taken by a girl who rubbed her lips with it till they bled: this she *spit* into some water on one side of her while the poor girl round whose head the string went imagined it came from her conveyed by the string.

They never broil fish at night because they think the wind will blow a contrary way to what they want it.

They will not whistle under a rock, having a tradition that some of the natives died while feasting under one and it fell from a great height and crushed them to death.

After this it is hardly requisite to say they believe in spirits. An apparition they say advances slowly, with its hand in a line with its face and seizes the person it intends to visit by the throat. The repository of the dead and even the darkness of the night are too powerful for their fears.

Those indeed who can encounter these seeming perils are esteemed proper persons to become Cor-rah-dys. The shooting of a star and thunder and lightning they fear much.

Correspondence.

RECEPTION IN HONOUR OF DR. ROBERT SCOT SKIRVING.

SIR: The board of directors of the Royal Prince Alfred Hospital has arranged for a reception to be held at the hospital at 3.30 p.m. on May 24 in honour of Dr. Robert Scot Skirving, who was the medical superintendent of the hospital 1883-1884 and who is the senior honorary consulting medical officer of the hospital. Present and past members of the honorary medical staff and resident medical staff of the hospital are cordially invited to attend the reception. Those who propose to attend the reception are requested to advise me by May 23.

Yours, etc.,
H. SELLE,
General Superintendent.

Royal Prince Alfred Hospital,
Camperdown,
New South Wales.
May 5, 1955.

Post-Graduate Work.

THE MELBOURNE MEDICAL POST-GRADUATE COMMITTEE.

Programme for June, 1955.

Course in Medicine.

A COURSE in medicine at Saint Vincent's Hospital, suitable for candidates for M.D. Part II and M.R.A.C.P., will commence on June 6. This course will be conducted by the honorary medical staff of the hospital on six mornings a week for eight weeks. It will consist of ward rounds, clinical demonstrations, lectures, case presentations and demonstrations of X-ray films, electrocardiograms, pathology specimens *et cetera*. The fee for the course will be £31 10s., and enrolments should be made with the Melbourne Medical Post-Graduate Committee, who will supply a timetable on request.

Course in Bacteriology and Microbiology.

A course in bacteriology and microbiology, suitable for candidates for Part II of the M.D. and M.S. and Part II of the diplomas, will commence on June 7 and continue on Tuesdays till August 9 inclusive, at 4.15 p.m. From June 7, ten lectures on microbiology will be given for all candidates. From July 19, four practical demonstrations will be given for all candidates at 2.15 p.m. From August 16, for three or four weeks, special lectures for diploma candidates will be given in separate classes. All classes will be held at the Bacteriology Department, University of Melbourne. The fee for the course is £10 10s., and enrolments, on the Committee's forms, should be received at their office by May 24, together with fee.

Lectures in Psychiatry.

A course of lectures in psychiatry suitable for candidates for the diploma in psychological medicine will commence on June 7 and continue for three months on Tuesdays and Thursdays at 8 p.m. at 45 Spring Street, Melbourne. Two

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED APRIL 30, 1955.[1]

Disease.	New South Wales.	Victoria.	Queensland	South Australia.	Western Australia.	Tasmania.[2]	Northern Territory.[2]	Australian Capital Territory.	Australia.[3]
Acute Rheumatism	3(2)	..	2(2)	..	1	..	..	..	6
Amœbiasis	..	..	1(1)	..	..	..	..	..	1
Ancylostomiasis	..	..	60	..	..	..	..	..	60
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	1	1	..	..	..	..	..	..	2
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	1	1	4(3)	..	..	..	..	..	6
Diphtheria	8(2)	4(4)	1(1)	..	10(10)	..	..	..	23
Dysentery (Bacillary)	..	1(1)	1(1)	..	2(1)	..	..	..	4
Encephalitis	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	40(12)	44(30)	..	6(2)	5(2)	..	..	..	95
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	..	..	2	..	..	..	..	..	2
Malaria	..	..	2(2)	..	..	..	..	..	2
Meningococcal Infection	1	2(1)	2(1)	1	1(1)	..	..	..	7
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	4(1)	5(2)	5	3(1)	2	..	..	..	19
Puerperal Fever	..	..	1(1)	..	1	..	..	..	2
Rubella	..	..	1	..	32(32)	..	..	..	33
Salmonella Infection	..	4(2)	..	..	..	..	..	..	4
Scarlet Fever	11(4)	30(16)	3(2)	13(7)	4(3)	..	..	..	61
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	1	1	..	..	..	..	..	2
Trachoma	..	..	..	..	1	..	..	..	1
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	59(43)	12(7)	10(3)	8(7)	4(4)	..	..	..	93
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

[2] Figures not available.

[3] Figures incomplete owing to absence of returns from Tasmania and Northern Territory.

or three seminars will also be held at week-ends at the Royal Park Receiving House. The fee for this course will be £14 14s., and enrolments should be received at the Committee's office by May 24.

Address of Committee.

The address of the Melbourne Medical Post-Graduate Committee is 394 Albert Street, East Melbourne, C.2. Telephone: FB 2547.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Week-end Course at Bathurst.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that a week-end course will be held at the Bathurst Town Hall in conjunction with the Western District Medical Association on Saturday and Sunday, June 4 and 5, 1955. The programme is as follows:

Saturday, June 4: 2.30 p.m., "The Management of Hypertension", Dr. Hales Wilson; 4 p.m., "Pelvic Pain", Dr. Angus Murray.

Sunday, June 5: 10 a.m., "The Painful Shoulder", Dr. Cecil Langton; 11.30 a.m., (*a*) "Diagnosis and Treatment of Anæmia", (*b*) "Management of Diabetes during Intercurrent Disease", Dr. Hales Wilson; 2 p.m., "The Place of Cæsarean Section in Obstetrics", Dr. Angus Murray; 3 p.m., "Fractures in the Region of the Elbow in Children", Dr. Cecil Langton.

The fee for attendance is £3 3s. Those wishing to attend are requested to notify Dr. Brooke Moore, 142 William Street, Bathurst, as soon as possible.

Obituary.

JOHN COFFEY.

DR. JOHN COFFEY, sometime Director-General of Health of Queensland, died at Ascot, Queensland. He was seventy-seven years of age and was born in the Wimmera district of Victoria. His early education was undertaken at Xavier College, Kew, Victoria, but he studied medicine in Scotland. He qualified as licentiate of the Royal Colleges of Physicians and Surgeons of Edinburgh and of the Faculty of Physicians and Surgeons of Glasgow in 1905. Apparently he intended to join a public health service, because he gained the diploma of public health of the Royal Colleges of Physicians and Surgeons of Ireland in 1906. In 1915 he gained his F.R.C.S. diploma of Edinburgh. He served with the Royal Army Medical Corps in the first World War. In 1922 he joined the public health service in Queensland and gave continuous service till his death. In 1922 he succeeded the late Dr. J. I. Moore as Health Commissioner of Queensland and in 1946 became Director-General of Health on the resignation of Sir Raphael Cilento. He retired in 1947. He is survived by his widow and one daughter.

Congresses.

WORLD FEDERATION FOR MENTAL HEALTH ANNUAL MEETING.

THE eighth annual meeting of the World Federation for Mental Health will be held in Istambul, Turkey, from August 21 to 27, 1955. The theme of the meeting will be: "Family Mental Health and the State." The programme will include addresses and discussions on the family and education, mental health and the upbringing of small children, the problem of abandoned children, legislation and the family, mental health of families in rural areas, the family and backward and delinquent children, family problems of sickness and disablement. Suggested topics for discussion groups are mental health and the school, religion and mental health, problems of relationships within the family, psychiatric problems in medical practice, and alcoholism and the family. Requests for fuller information and forms of application for registration and hotel accommodation should be sent to the Secretary-General, World Federation for Mental Health, 19 Manchester Street, London, W.1, England, or to Dr. Ian Martin, Honorary Secretary, Australasian Association of Psychiatrists, 34 Erin Street, Richmond, Victoria.

Deaths.

THE following deaths have been announced:

RENTON.—Douglas George Renton, on May 2, 1955, at Melbourne.

KENNEDY.—Arthur James Kennedy, on May 2, 1955, at Maryborough, Queensland.

PERN.—Norman Pern, on May 5, 1955, at Sydney.

Diary for the Month.

MAY 24.—New South Wales Branch, B.M.A.: Ethics Committee.
MAY 25.—Victorian Branch, B.M.A.: Branch Council.
MAY 26.—South Australian Branch, B.M.A.: Scientific Meeting.
MAY 26.—New South Wales Branch, B.M.A.: Branch Meeting.
MAY 27.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all contract practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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